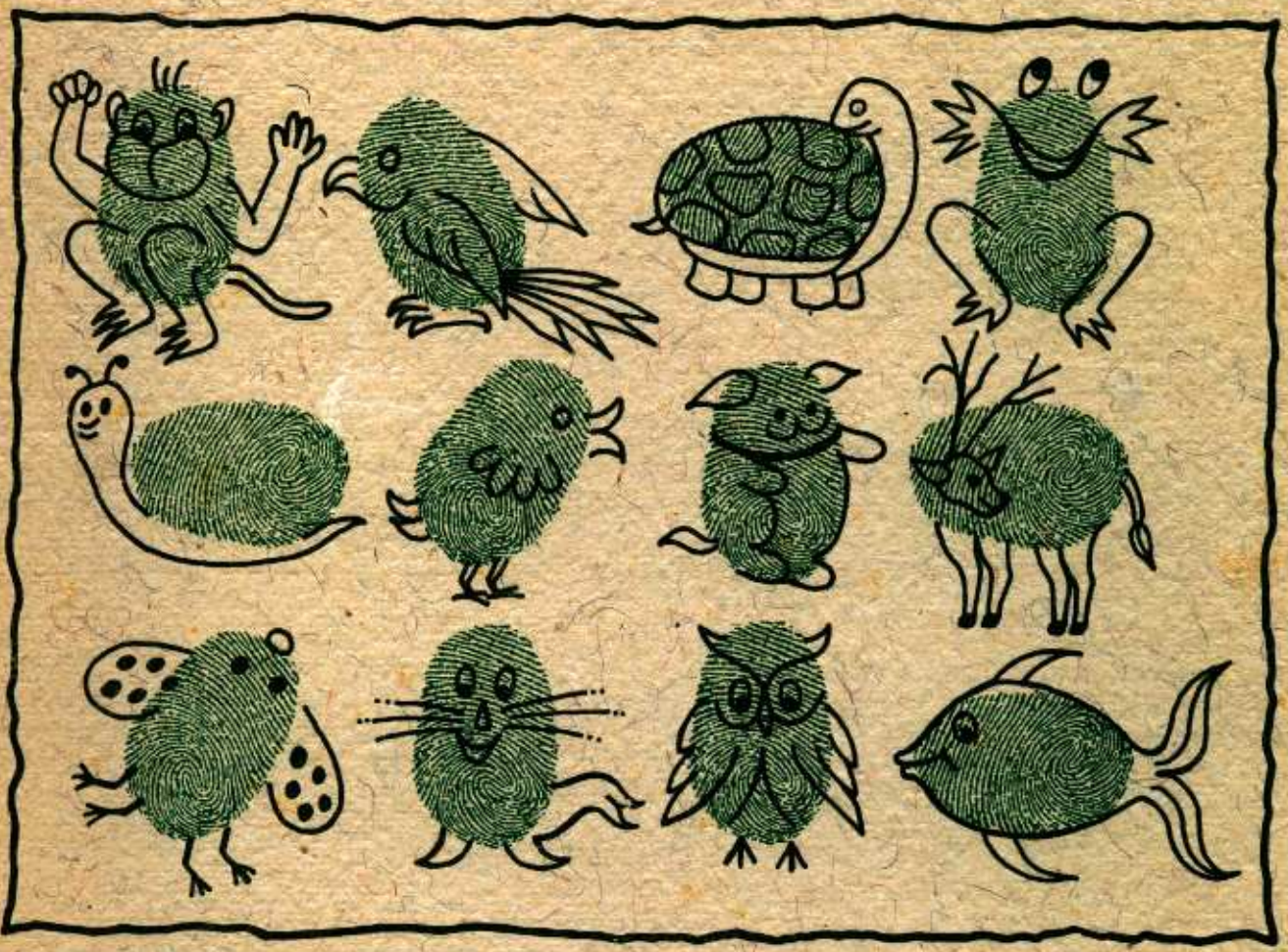
GREEN SCHOOL SERIES

Wild at the Zoo

An Information and Activity Manual on Educational Opportunities at a Zoo



CEE

Centre for Environment Education, Ahmedabad

A Publication Supported by Ministry of Human Resource Development, Government of India

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Centre for Environment Education, Ahmedabad

A Publication Supported by Ministry of Human Resource Development, Government of India

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Some of the activities in this manual have been adapted from, or draw upon, two international environmental education materials: project WILD and NatureScope.

Centre for Environment Education, India is one of the international organizational sponsors of project WILD, and also a partner of NatureScope.

project WILD, an interdisciplinary, supplementary conservation and environmental education programme emphasizing wildlife, is a joint project of the Council for Environmental Education and Western Association of Fish and Wildlife Agencies. Address: 707 Conservation Lane, Suite 305, Gaithersburg, Maryland 20878, USA.

NatureScope is an environmental education publication for elementary and middle school educators. NatureScope is published by National Wildlife Federation, the world's largest membership organization promoting wise use and conservation of natural resources. More information regarding the National Wildlife Federation and its programmes can be obtained directly by writing to the Federation at 8925 Leesburg Pike, Vienna, Virginia 22184, USA.

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Centre for Environment Education (CEE) is a national institute of excellence for Environmental Education supported by the Ministry of Environment and Forests, Government of India and affiliated to the Nehru Foundation for Development. The main objective of CEE is to create environmental awareness among children, youth, decision makers and the general community. CEE develops innovative programmes and materials and field tests them for their validity and effectiveness. The aim is to provide models that could be easily replicable to suit local conditions.

About This Book

This book has three sections:

Section I: Understanding a Zoo

This provides background information about zoos, including the role of zoos in conservation, research and education the history of zoos, the working and management of zoos as well as organizations involved in zoo management. This information would be useful in understanding how zoos are more than places for mere recreation but rather that they serve a larger conservation education purpose. Also included are specific suggestions on how an educator can use this facility to plan and create an exciting teaching-learning experience. Thus the first section is meant to serve as a useful starting point for anyone to plan a visit to the zoo so as to make it more educational than a picnic, but certainly as much fun as an outing. This information can be shared with the students to create a greater interest in, and anticipation of, a forthcoming zoo visit.

Section II: Worksheets

This includes a set of ten worksheets, each one developed around a specific theme such as mammals, birds, reptiles, ears, eyes, tails, etc. These worksheets are to be filled in by each student, based on their own observations while going around the zoo. The worksheets are designed so that students get an idea of the great variety, in form and function in Nature as well as some commonalities that animals share. They will also sharpen students' skills of observation, recording and classifying information.

The worksheets may be duplicated and distributed, or copied out by each student, so as to be used during the zoo visit. Depending on the time available and/or your own planning for the visit, you could decide which of the worksheets the students can fill during the visit.

Section III: Activities

The selection of twenty activities covers a wide range of objectives—starting with creating an awareness and appreciation of wildlife, to observing and noting the variety of form and function in the animal world, to an understanding of ecological principles and interrelationships in nature.

The activities may be used to introduce or reinforce these objectives. You may choose to do them before, during or after the zoo visit, depending on your overall plan and situation.

Each activity includes a statement of the instructional objective, the main subject area covered, duration, recommended group size, setting (indoor or outdoor), materials required, a step by step procedure, and a few questions to evaluate student learning. Each activity is designed to stand alone, so you may pick and choose the activities to best suit your requirements.

Wild Facts: Each worksheet and activity is accompanied by a note which provides background information about the topic it covers. This would be useful for introducing the topic, or generating further discussion amongst the students.

We hope that this book will provide you with ideas, information and inspiration to not only go to the zoo, but to make every zoo visit exciting and educational.

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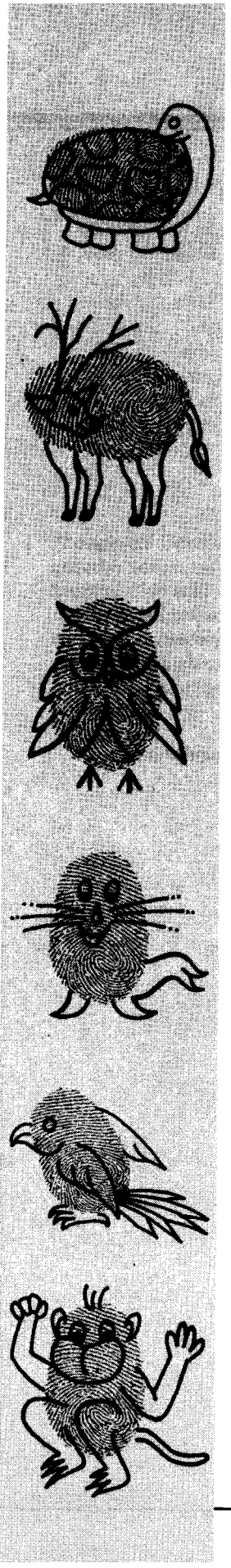


SECTION I
UNDERSTANDING A ZOO

All About a Zoo

What is a Zoo?

Most of us would have visited zoos at one point of time or another, usually during our childhood—with parents or as part of our school programmes. Many people think of a zoo as a place for relaxation, entertainment, a place to have fun. Although the initial purpose of zoos was entertainment, over the decades, zoos have got transformed into centres for wildlife conservation and environmental education.

Zoos evoke strong reactions. People appreciate the opportunity to see animals they would never otherwise get a chance to see. This may be the closest to wildlife that many urban people may get, and so zoos provide a unique opportunity to create an interest and love for animals. While many people enjoy visiting zoos, others strongly feel that it is wrong to keep animals in captivity. It is true that some animals seem unable to settle down and live happily in a zoo. On the other hand, it must be remembered that many of these animals would not have survived without zoos. Apart from saving individual animals, zoos have a role to play in species conservation too. Many animal species are greatly reduced in numbers because of hunting, habitat loss etc. Zoos could help save many of these species from becoming extinct, through captive breeding.

The learnings and the experiences gained while interacting with live animals—seeing, hearing or touching them—cannot be replaced by other modes of education. Live animals create curiosity and interest. Zoos provide an opportunity to open up a whole new world, and this could be used in sensitising visitors regarding the value and need for conservation of wildlife.

"Zoological Garden, frequently called a zoo, is an institution for keeping alive wild and domesticated animals in captivity, commonly in a park or garden that is usually open to the public for education and recreation"

Academic American Encyclopedia

Operation Oryx

Apart from maintaining animal collections as a basis for zoo education and research, zoos can also directly contribute to preventing extinction of species. The population of certain endangered species can be increased in zoos through captive breeding programmes.

The Arabian Oryx was almost extinct in the wild in 1972 because it used to be hunted for sport. All the surviving oryx were then collected together from zoos to establish a captive breeding herd in Phoenix, Arizona, USA. The rescue plan was called 'Operation Oryrx'. In 1982, the animals bred successfully. They were released into their original habitat in Oman–after laws to protect the oryx from hunting were passed by the local government. Today, the wild herd is breeding successfully in Oman.

Why Zoos?

- Zoos are the only place for the general public to encounter wildlife in "safe" situations and at reasonable cost.
- Zoos maintain a collection of living animals from different parts of the country, sometimes from other parts of the world as well. In a single day, one can see animals of different kinds, and possibly get an idea about their habitats.
- About 60, 00,00,000 (one-tenth of the human race) visit zoos somewhere or other in the world each year. 5,00,00,000 people visit zoos every year in India. Zoos are thus among the greatest oppurtunities for conservation education.
- Zoos are suitable places for animals whose numbers have reduced drastically in the wild, and help in captive breeding of animals.
- Zoos offer the opportunity for scientific study of animals. Many university students of zoology and veterinary science use zoos as their "laboratory" or a place where they can carry out practical research or field studies. Scientists doing behavioural studies of animals visit zoos to study the captive animals.
- Zoos offer individual animals protection from poachers and other problems. In the wild, animals face threats such as hunting, poaching, loss of habitat and pollution of air, water, etc. Inside zoos, the animals are safe from these threats.

Blackbuck

What should Zoos do?

Zoos were initially started for the entertainment of people. Gradually, over the years, they have come to play an important role in conservation.

Today the ultimate goal of zoos is the conservation of animals in the wild. In order to achieve this goal, zoos conduct research on the habits of animals. By educating people in general about the status of, and the threats to, wildlife, they create support for conservation. The objectives of zoos are Conservation, Research and Education.

Conservation: Many species are endangered by habitat destruction. A zoo is an ideal place to breed such endangered animals. The most important function of a zoo is as a reservoir of rare animals, which can be bred in captivity. This provides stocks for other zoos and keeps the animals safe for possible rehabilitation (reintroduction) in the wild. Such captive breeding has to be done in addition to preserving wild habitats. Breeding of endangered species in zoos is one part of the overall conservation strategy.

Research: Zoos provide a living laboratory for basic scientific research. They offer opportunities to conduct research on the behaviour and biology of animals, that would be extremely difficult to undertake in the wild.

For a field biologist, it is very difficult to study behaviour, feeding habits, etc. of animals in the wild. Animals are not easy to come by. It is also difficult to transport and set up the equipment needed for scientific investigation in the wild. It is also not fair to disturb the animals for investigations. Many such investigations are mostly conducted in zoos. The little data collected in the wild is often compared with the data obtained from zoos.

Education: Zoos have tremendous potential for educating people of different ages and backgrounds about wildlife. They are excellent institutions to increase public awareness about the values of nature. Considering the number of visitors to zoos, the scope of zoo education becomes large and positive.

Living animals that attract visitors form the basis for zoo education. Therefore, the most important education zoos provide is the love and fascination for animals. This can serve as a starting point to stimulate the visitors to become aware of the wonders of nature, relationships and the balance of the living world.

Zoos would be appropriate places to impart to the visitors information about animals, their habitats, biology, and threats to their existence.

A National Zoo Policy has been notified on 28 October 1998 by the Ministry of Environment and Forests, Government of India. This policy aims at giving proper direction and thrust to the management of zoos by mustering cooperation and participation of all concerned. The policy gives due importance to education and outreach activities in zoos.

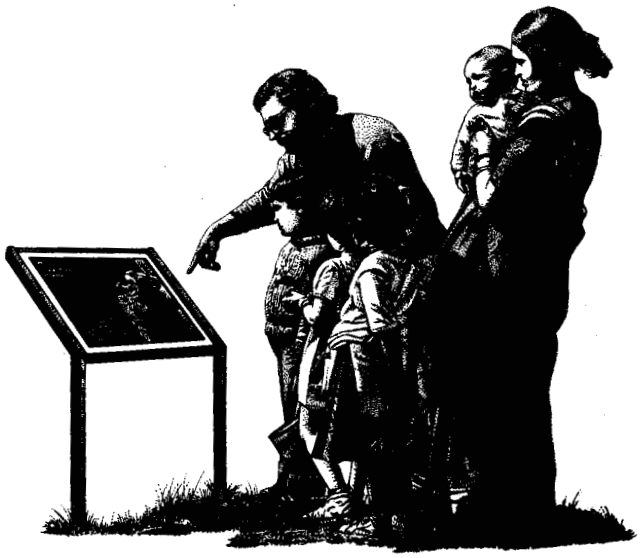
A large number of school children visit zoos each year, and therefore zoos have a tremendous potential to generate interest about wildlife among this important and impressionable group. This is a perfect place to teach concepts, change attitudes, give information, and create a love for the natural world. Anything from art and zoology to geography can be taught in zoos. Zoos offer a unique combination of resources that are not available in the classroom. The educational outcomes can be memorable and long-lasting.

Zoos are institutions that can uniquely integrate the three major tasks of conservation, research and education. More and more zoos are linking their work directly to the survival of animals in the wild, especially in national parks and protected areas. For example, the Sakkarbaug Zoo in Junagadh, Gujarat works closely with the Gir Sanctuary which is the last natural home of the Asiatic Lions.

Interpretation

Interpretation is defined as an educational activity which aims to reveal meaning and relationship through the use of original objects, by first-hand experience, and by illustrative media, rather than simply communicating factual information. In a zoo, such programmes help visitors to understand the uniqueness of each animal and its relationship to its surroundings. Interpretation can be done through a variety of means and media—exhibits, signages, publications—booklets, brochures, guided tours, etc.

Centre for Environment Education (CEE) develops interpretative programmes for zoos, national parks and heritage sites. One such programme that you can see is at the National Zoological Park, New Delhi. Signages outside the animal enclosures highlight fascinating facts about the animals. Keeping in mind that visitors do not want to read long text in highly scientific language, the effort has been to provide interesting information and arouse curiousity, rather than to tell visitors all about every animal at the zoo. Apart from interpretive signage for the animals in the zoo, signage has also been provided for plants which do not otherwise get noticed by an average visitor to the zoo.



Zoos for Conservation

Zoos are very important for the conservation of Biodiversity. Biodiversity or Biological Diversity, refers to the range of life forms on Earth.

Several measures have been taken to protect biodiversity. These include legal measures, *in-situ* and *ex-situ* conservation efforts.

***In-situ* conservation** is preserving wild plants and animals in their natural habitat, or domesticated plants and animals in their areas of domestication or cultivation and use.

***Ex-situ* conservation** is preserving life forms away from the natural habitat, in a zoo, botanical garden, aquarium, gene bank or other facility.

India has a long history of *in-situ* conservation of wild species of flora and fauna through the establishment of protected areas across the country.

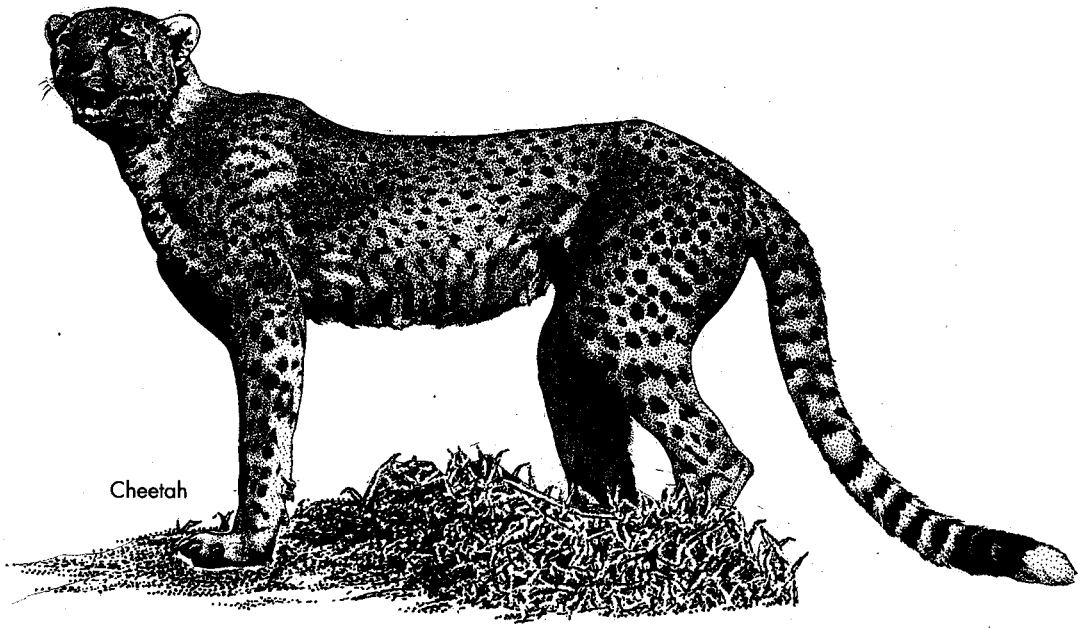
The *ex-situ* conservation of plants and animals is being carried out in several kinds of institutions such as zoological parks, botanical gardens and agricultural research centres.

It is generally accepted that *in-situ* conservation is the prime mechanism for conservation and *ex-situ* conservation measures should support the *in-situ* measures.

By these measures, many animal and plant species can be saved from becoming extinct.

Laws for Wildlife

Wildlife (Protection) Act, 1972, and Wildlife (Protection) Amendment Act, 1991: These deal with the restriction on and prohibition of hunting of animals, and with the protection of specified plants. They also deal with the setting up and management of sanctuaries and national parks, setting up of the Zoos Authority, control of zoos and captive breeding. The Act also controls trade and commerce in wild animals, animal articles and trophies.



Cheetah

Threat Categories for Species at Risk

IUCN, the World Conservation Union, is the world's largest conservation network. Its members include many governments and non-governmental organisations. IUCN has developed The Red Data Book aimed at categorizing species at risk according to the severity of the threats facing them, and estimating the imminence of their extinction. The IUCN threat categories used in the Red Lists, with their definitions, are given below.

In order to understand these, it is necessary to understand what a taxon is. *Taxon* (plural *taxa*) is any group of organisms or population considered to be sufficently distinct from other such groups to be treated as a separate unit.

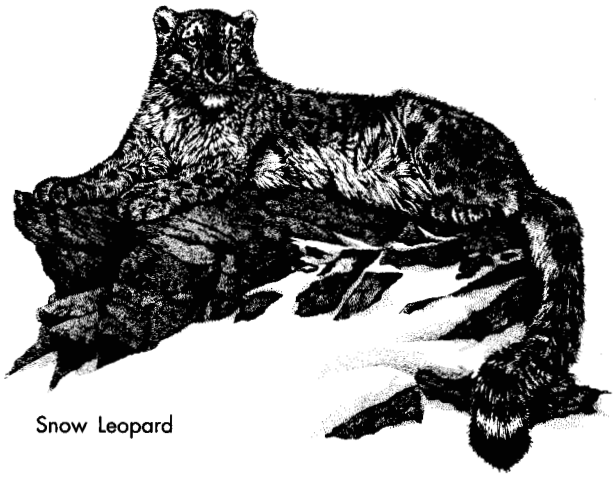
Extinct (EX): A taxon is Extinct when there is no reasonable doubt that the last individual has died. For example, the Cheetah, Pink-headed Duck, Himalayan Quail are extinct in India.

Pink-headed Duck

Extinct in the wild (EW): A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range.

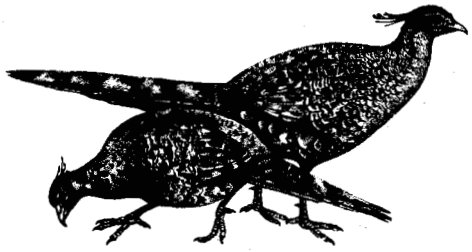
Critically Endangered (CR): A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.

Endangered (EN): A taxon is Endangered when it is not Critically Endangered, but is facing a very high risk of extinction in the wild in the near future. For example, Nicobar Tree Shrew, Liontailed Macaque, Tiger, Snow Leopard, Lesser Panda, Asian Elephant, Great Indian Rhinoceros, Nilgiri Tahr, Siberian Crane, Jerdon's Courser.



Snow Leopard

Vulnerable (VU): A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future. For example, Nilgiri Leaf Monkey, Dhole, Clouded Leopard, Sloth Bear, Gaur, Spot-billed Pelican, Cheer Pheasant.



Cheer Pheasant

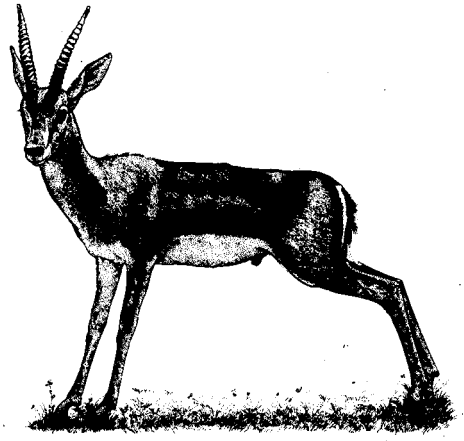
Lower risk (LR): A taxon is classified as Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories—Critically Endangered, Endangered, or Vulnerable.

Taxa included in the Lower Risk category can be seperated into three subcategories.

Conservation Dependent (cd): Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within five years. For example, Nilgai, Chinkara, Scaly Clam.

Near Threatened (nt): Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable. For example, Crab-eating Macaque, Fishing Cat, Indian Pangolin.

Least Concern (lc): Taxa which do not qualify for Conservation Dependent or Near Threatened.



Chinkara

Data Deficient (DD): A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution could be lacking. Data Deficient is therefore not a category of threat or Lower Risk. It indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data is available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, and if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified. Examples: Hoolock Gibbon, Bengal Fox, Rusty-spotted Cat, Indian Black Turtle.

Not Evaluated (NE): A Taxon is Not Evaluated when it has not yet been assessed against the criteria.

(Source: www.iucn.org)

Fishing Cat

History of Zoos

Since time immemorial, animals have been kept by people for work, warfare, food and entertainment. Emperors and kings maintained collections of wild animals in their palaces as a status symbol and for their amusement. It was in 1759 that the first animal collection came to be built as a zoo in Schonbrum near Vienna.

Zoos around the world started in many different ways. Most of the early zoos started as private collections. Their popularity among the public eventually opened them to visitors. Most large zoos were founded by either private societies or by municipalities.

In India: Ancient Hindu literature is full of references to wild animals and many a Hindu god has an animal *vahana*. It is said that Gautama Buddha gave his first Discourse in a deer park. Ashrams of *Rishis* had deer and birds of various kinds. Deer parks were commonly maintained in ashrams. Private menageries and *shikarkhanas* were kept by emperors, maharajas, nawabs and the British. The first zoo was probably the one started by Raja Rajendra Mallick in his private mansion in 1854. It is popularly known as the Marble Palace Zoo and is still in existence in Calcutta. Raja Mallick was also one of the persons responsible for establishing the Alipore Zoological Garden. Different kinds of birds and animals were brought for display here and were visited by several people from near and far away places.

Tiger cub

Madras Zoo founded in 1855 can probably claim to being India's first zoo to begin as a result of a visitor pressure.

Col. Edward Balfour of the Government Central Museum, Madras had a young cheetah and a young tiger in the museum for a few months in 1854. He noted that there was a tremendous increase in the number of visitors. When the animals were removed, the figures fell alarmingly. He noted down the fluctuation in numbers, and prompted by this visitor information, the Madras Zoo was started. The zoo was closed down in 1980 and shifted to a new area. The new Zoological Park, known as the Arignar Anna Zoological Park is at Vandalur, near Chennai (Madras) and is based on modern concepts of zoo design. In 1955, the first All India meeting of Zoo Superintendents was held in Madras Zoo. At that meeting, the topics of discussion included education, conservation and setting up of insect zoos. At that time, zoos were administered under the Indian Board for Wildlife.

The Venkateswara Zoological Park in Tirupati, Indira Gandhi Zoological Park in Vishakhapatnam, the Nehru Zoological Park in Hyderabad, National Zoological Park in New Delhi, Arignar Anna Zoological Park at Vandalur, Chennai and Sri Chamarajendra Zoological Park in Mysore are some of the innovative zoos that have come up in the last three decades.

Central Zoo Authority

The Government of India took a policy decision in 1988 that the main objective of the management of zoos in India would be conservation. Captive breeding of endangered species and creation of empathy towards wildlife would be the main goals to be achieved. Recreation would be encouraged only to the extent that it is consistent with the conservation objective.

It was also decided that to ensure successful captive breeding programmes, certain legally enforceable standards and norms of upkeep and management of animals in zoos would be enacted and enforced.

As a follow up of the decision, the Central Zoo Authority (CZA) was set up in 1992 as a statutory body under the Ministry of Environment and Forests, Government of India. Now, no zoo can operate in India without recognition by this Authority.

The main functions of the CZA are:

- Recognition of zoos and enforcing of the minimun standards and norms of management;
- Providing financial assistance to zoos in planned development;
- Coordinating captive breeding programmes for endangered species on scientific lines and organizing frequent exchanges of animals between zoos;
- Training and education in zoo management;
- Providing technology for modern aspects of zoo management through international cooperation;
- Establishing linkages between *ex-situ* and *in-situ* conservation.

One of the major responsibilities of CZA is the inspection and evaluation of zoos. After inspection, recommendations for improvement are given. If a zoo does not provide adequate enclosures for the animals and is not in a position to improve the facilities, CZA can close down the zoo, and distribute the animals to other zoos.

All zoos need to be recognized by the Central Zoo Authority. Locally they work under the city municipal corporations or state forest departments.

The symbol of the CZA is a pair of interlocking hands, suggestive of cooperation and inter-dependence. Note that the black hand looks like a mammal and the white hand looks like a bird. The letter 'C' enclosed stands for the first letter of the Central Zoo Authority, as well as "Conservation", indicating the resolve of the CZA to conserve wildlife. The openess of the form is suggestive of getting away from the traditional bar-like enclosures. CZA's logo was designed by CEE.

Source: *Indian Zoo Year Book*, Vol. 1/1996, Indian Zoo Directors' Association and CZA.

Classification of Zoos

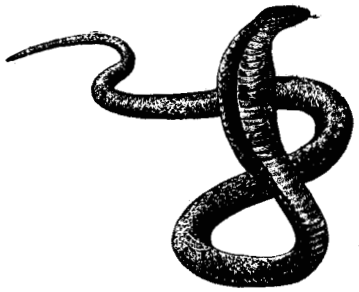
There are more than 300 zoological parks in India. On the basis of the area, number of animals, and variety exhibited, as well as the number of visitors, zoos are classified as Large, Medium, Small and Mini.

	Category			
	Large	**Medium**	**Small**	**Mini**
Area	More than 75 ha	50–75 ha	20–50 ha	Less than 20 ha
Number of animals exhibited	More than 750	500–750	200–499	200
Variety of animals exhibited	More than 75	50–75	20–49	20
Number of endangered animals exhibited	More than 15	10–15	5–9	Less than 5
Annual attendance of visitors per year	More than 7.5 lakhs	5–7.5 lakhs	2–5 lakhs	Less than 2 lakhs

Source: Indian Zoo Year Book Vol. 1996

Snakes and Sundarvan

Sundarvan Nature Discovery Centre, Ahmedabad, which is designated as a mini zoo, is best known for its display of snakes. The popular Snake Show includes a talk and demonstration of some common snakes, and seeks to dispel some common myths about snakes. The show also encourages people to observe closely, and even touch, some non-venomous snakes, while volunteers talk about them. Another unique feature of the Centre is that people who find a snake in their home or garden may call Sundarvan, which arranges for the snake to be caught and brought back to the Centre. Every year, hundreds of such calls prevent numerous snakes from being needlessly killed.



Mobile Snake Show was also one of the programmes of Sundarvan. This show, which was mounted on a camel cart, visited several schools and about 20 villages. The four common species of venomous snakes and several non-venomous snakes were displayed. Live interpretation was provided by the Sundarvan animal keepers who accompanied the show. This was aimed at dispelling prevalant myths about snakes and providing scientifically correct information. Over 35,000 people witnessed the travelling show.

Who's Who in a Zoo

A zoo is like a township, needing a variety of services to keep it going efficiently. The staff of the zoo is divided into different sections. The Director of the zoo is overall in-charge of zoo operations at the site. A Joint Director usually assists the Director and stands in for the Director in his/her absence. The Joint Director directly coordinates with the different sections in the zoo.

As per the CZA rules, every zoo has to have one full-time officer in charge of the zoo. The said officer is delegated adequate administrative and financial powers as may be necessary for proper upkeep and care of zoo animals.

Usually, a zoo is organized as follows:

Administrative Section: Deals with matters pertaining to appointments, probations, pensions, etc. Other responsibilities include co-ordination within and outside the zoo.

Horticulture Section: Greenery is a very important element of all zoos. This section consists of Supevisors, Gardeners and Sweepers. They maintain the plants and trees in the zoo and also take care of the vegetation inside the enclosures. They have to ensure that the plants are not damaged by the visitors. This section is also responsible for cleaning the zoo and clearing the trash left by visitors.

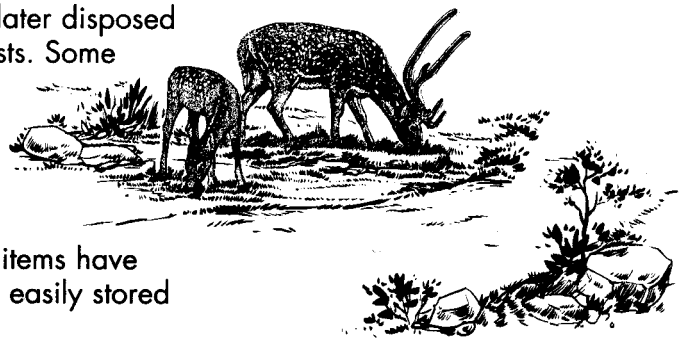
Animals Section: The major responsibility of this section is to safeguard the health of the zoo animals by providing nutritious food, hygienic upkeep and treatment of the animals when they fall sick. People in this section deal with animals directly. Zoo Rangers or Inspectors, Head Keepers and Assistant Keepers are part of this section.

The animals are handled only by staff having experience and training in handling individual animals. If any animal is found sick, injured or unduly stressed, the matter has to be reported to the Veterinary Officer for providing treatment at the earliest. Every zoo has a Veterinary Officer. Most zoos have a hospital, laboratory and operation theatre.

If any animal dies, the vet does a post-mortem to find out the reason for the death of the animal. The body is later disposed off, by burning or incinerating, as the vet suggests. Some dead animals are used for taxidermy. The vet also helps to work out practical diets for zoo animals. Such a diet is worked out on the basis of food items that a particular animal will easily accept, that will provide a nutritious diet for that animal, and are available easily. Selected food items have to be such as are not quickly perishable, can be easily stored and handled.

"Every large zoo shall have at least one full-time curator having the sole responsibility of looking after the upkeep of animals and maintenance of animal enclosures"

Source: The Indian Zoo Year Book, Vol. 1, 1996

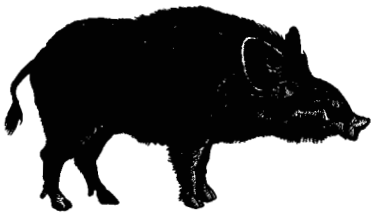


As per CZA regulations, each large zoo shall have at least two full-time veterinarians and medium and small zoos shall have at least one full-time veterinarian. A mini zoo will at least have arrangements with any outside veterinarian for visiting the zoo every day to look after the animals.

Security Section: The Security Section safeguards the property of the zoo round the clock. It is responsible for providing security to animals and the visiting public, and for maintaining neccesary law and order in the zoo. It also helps lost children to find their parents and vice versa, keeps on eye open for pick-pockets, animal teasers and other anti-social elements. The Security Supervisor and Head Watchman are responsible for checking tickets.

Stores Section: This section is responsible for maintaining consumable and non-consumable items.

Consumable items like food and medicines for the zoo animals are bought, stored and processed by this Section. The Stores Officer keeps a record of stocks of food material (rice, meat, milk, fruits etc). The Store Keeper also takes care of the procurement, supply and maintenance of non-consumable items.



Wild Boar

Maintenance Section: This Section does the repair work on animal enclosures, waterlines, garden equipment; removal and installation of signboards, etc. It also installs winter and summer fittings in animal houses wherever required—for example, covering animal enclosures with wet gunny bags in summer.

Education Section: This section is an important link between people and animals. The staff works towards creating awareness, giving information and creating love and empathy in the hearts of the people for zoo animals and wildlife in general. They attend to groups of school children and conduct tours, slide shows, etc. This section also looks after the Zoo library.

One way of educating people is through the signboards outside each enclosure, which give information about the animals. Many zoos also organize live animal and bird shows and demonstrations. The Education Section also looks after publicity and public relations.

The Zoo Keeper: The Keeper is directly responsible for the feeding of the animals and cleaning of their enclosures. He or she is always alert to stop visitors from teasing the animals. The Keeper is in close contact with the animal and therefore gains practical knowledge about the animal. This becomes very useful when the animal is ill.

Animals very often try to conceal that they are sick, until they are nearly dead. The Keeper is the first to spot the trouble by noticing slightest changes in behaviour, appetite, or the way of

standing and sitting—things a casual visitor would overlook. The Vet is then called. It is very difficult for the Vet to measure pulse, temperature, blood pressure, etc. without disturbing the animal. The Vet usually collects some of the animal's droppings and sends it to the laboratory for examination. The treatment is started after the disease is diagnosed. In most cases, medicines are given by mouth rather than injection. Unless the medicine tastes good to the animal, it will not accept it. The only way to get it down its throat is to put it in the food. This is where the Keeper can often help.

Volunteers: Several parks have volunteers who help guide visitors around and give them information, or provide special educational programmes for the visitors. The Van Vihar National Park at Bhopal is a modern zoological park where animals are kept in near-natural habitat setting. This medium zoo works with the local nature club and the local office of WWF-India in conservation awareness programmes. The members of these organisations work as volunteers at the zoo on Saturdays and Sundays. The volunteers stop the visitors from teasing the animals and talk to them about the dangers of feeding and disturbing the animals. Some volunteers also guide visitors inside the zoo.

A Healthy Zoo

In order to provide satisfactory conditions for the animals, their caretakers and the visitors, zoos have to be planned and run keeping in mind certain factors. These include:

Enclosures: Animal enclosures in a zoo must be so designed as to ensure the safety of visitors and caretakers, and the well-being of the animals. Enclosures should be planned in a way that simulates the conditions of the natural habitat of the animal in the enclosure. This would include planting of suitable tree species, providing water bodies etc. Enclosures should also have suitable resting, feeding, drinking water and exercising facilities that suit the biological needs of each animal. All enclosures need to have adequate ventilation and lighting. Animals also need privacy.

Open enclosures need to have shelters for protecting animals against extremes of heat, rain, wind, etc. Special heating and cooling arrangements may be needed at least in some case, where species are unable to adjust themselves to the changed environment of the place.

In order to avoid the animals getting bored, they have to be provided with objects that would interest them, such as hanging ropes in the monkeys' enclosures and tilted earthern pots in the birds' enclosure. Animals need to be kept simply, in pairs or groups, according to the habits of the species in the wild.

Space: Space is a very important consideration in planning a zoo. Every animal or group of animals needs sufficient space for moving around and for exercise.

Food: Clean and nutritious food and regularity of supply ensure good health of animals. The food needs to be enriched with vitamins, mineral supplements, etc. Food storage arrangements are very important and should be such that rodents and insect pests are kept out, since they are carriers of various diseases.

Water: Clean water supply is necessary to help in preventing a number of communicable diseases. The drinking pools need to be cleaned periodically. Animals like sambar, bison, and hippopotamus like to wallow in water, and for this, additional provision needs to be made.

Closed day: Most zoos are closed to visitors once a week. This is necessary to provide the animals with some reprieve from continuous exposure to visitors as this can cause stress. It also gives a chance to the zoo authorities to carry out tasks like transfer of animals from one enclosure to another, etc.

How do Animals come to a Zoo?

Almost all new animals coming to zoos are acquired from other zoos through captive breeding programmes. Animals from the wild are acquired only as rescued ones, or for planned breeding programmes. Some birds like budgerigars, munias and pigeons may be brought from animal dealers.

Wild animals are today coming into conflict with humans as a result of disturbances and loss of habitat. Animals which are victims of such conflicts are rescued, and are brought to zoos.

Some animals, for example, tamed elephants and macaques, create havoc when they get beyond the control of their master. People and property are harmed by these animals. Zoos are called to help. The animals which are caught are brought to zoos for treatment and keeping.

Zoos exchange their surplus animals with other zoos. Permission and clearances from the concerned authority have to be taken for this.

Trade and Wildlife

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was signed in Washington DC and came into force in 1975.

The Convention attempts to prevent commercial trade in species of wildlife which are in danger of extinction, and to control the trade in species which might become so if their trade were allowed to continue unchecked. Appendix I of the Convention lists species banned from international commercial trade, and Appendix II lists those which may be traded provided that export permits have been issued. Importing countries are obliged to ensure that all imports of Appendix II specimens are accompanied by correct permits. India is a signatory to this Convention.

Going to the Zoo

Visitors are an integral part of any zoo. Zoos would not achieve the aim of "education" without the visitors.

Most people take their children to the zoo because of their prompting. But many people visit zoos without children too. In fact, in his book, *Towards Zoo 2000*, Jeremy Cherfas says, "I believe people visit zoos because there is something very rewarding about being in the presence of wild animals. We use the excuse of taking children"

The period and the number of visitors over the year is influenced by seasons, examinations, festivals, etc.

Who goes to a Zoo?

Zoos in India attract around 500 lakh visitors a year. Perhaps next to cinema halls, zoos have the credit of attracting such a large number of visitors. Thus zoos have a great potential for educating people.

Visiting the zoo is usually a family affair. The average group that visits zoos consists of 3-4 persons, who spend around 3-4 hours there.

Visitors to zoos come from a variety of backgrounds—urban and rural, young and old, literate and non-literate, small and large groups. Other than the regular visitors, there are people who come for specific purposes. Many photographers interested in wildlife visit zoos to take pictures of animals. Students of architecture visit zoos to study the design of the enclosures and the layout of the zoo. Many zoology students use zoos for their project work.

Why can some people not go to the Zoo?

Zoos are public institutions and open to all. But there are some people for whom going to public places is a difficult task. One such group of people are the handicapped. They might have some special requirements during their visit which many zoos may not be able to cater to. The Mysore Zoo has special programmes for such groups. Mentally handicapped children come regularly to this zoo and get special attention. Physically disabled can avail of the facility of a wheel chair free of cost. Stuffed animals are kept for the benefit of the blind. They can touch and feel their shape, size and texture. They can also read more about these through reading material in Braille. All such special visitors get free entry and other services.

75–87 per cent people visit a zoo for recreation

12–13 per cent people visit a zoo for education

Source: *Zoos Print*, November 1988

Water Monitor Lizard

As zoos are set up for the entire society, it is very important for zoos to have appropriate facilities for special groups. People who live very far from urban areas face the problem of distance. As most zoos are set up in cities and towns, people from villages may find it difficult to reach zoos. Visits to a zoo, for them, might not be a special one day programme. It may be a part of an overall city visit where they also visit other places like shops and markets, cinema halls, parks, etc.

All schools do not have transport facilities. Arranging a visit to zoos for such schools is not so easy. Some zoos such as the Van Vihar National Park at Bhopal provide bus facilities to schools and other groups who do not have transport facilities.

What you can do at a Zoo

At zoos, having fun and learning can go together. People must realise that animals they see at a zoo are special ones. Indeed, many species seen in zoos are threatened with extinction. Their population is decreasing in the wild due to various reasons. Some animals may be from far-away lands.

Usually, people spend only a few seconds at each enclosure and then hurry to the next. If more time is spent, a lot of things can be observed. Apart from observing animals, talking to a zoo keeper about the feeding, behaviour, etc. can be an interesting and educative experience.

Many visitors may look at enclosures full of rocks and plants and feel frustrated because they cannot see the animal. Actually, zoos try to make animal enclosures look and feel natural. This way, not only will the animals feel more at home, but the visitors too can see the animals in a habitat that is somewhat like its real one.

People are sometimes disappointed if a zoo does not have giraffes, hippos and other large animals. But they overlook small and interesting animals and animals that belong to India, and which may not be found anywhere else.

What not to do in a Zoo

Zoos are special places for animals, so it is very important to know what one should not do in a zoo. Visitors may disturb animals knowingly or unknowingly. There are often signboards in zoos which tell people the things that should not be done. These instructions must be taken seriously.

The National Zoological Park at New Delhi has been declared a 'no polybag' zone. No visitor can bring a plastic bag with food material into the zoo. This has been done to protect the animals, as plastic bags, empty, as well as with leftover snacks,

Dangerous Plastic

There are a number of cases where animals have died due to the consumption of plastic bags. In November 1998, a sambar died in Van Vihar National Park, a zoo in Bhopal. The post-mortem found that the animal had died due to consumption of plastic bags. About half a kilo of polythene bags were extracted from its stomach. The zoo is now distributing paper bags to the visitors and asking them to put the trash into the paper bag instead of throwing it around. The visitors deposit the bag at the gate while leaving the zoo. In this way, the zoo remains clean and animals are saved from consuming plastic bags.

which are dumped on the lawns or inside animal enclosures, may be swallowed by the animals. Polythene bags are non-biodegradable and cannot be digested. They can clog the digestive tract, and suffocate the animals to death.

There are two very important things that visitors to zoos must remember.

Do not feed the animals. This is the number one rule in a zoo. Each animal needs a different type of food. The food given at the zoo is special and similar to what the animals feed on in the wild. If they are fed with biscuits, wafers, etc. by the visitors, animals lose their appetite for the type of food they are meant to eat. Animals may also get infected with human diseases when visitors give them food. This can make animals sick and even lead to deaths.

Many people think that they are helping the animals by feeding them. This is where education to visitors to zoos becomes very essential.

Instead of feeding animals, it would be a good idea to wait until their keepers feed them, and have fun watching.

Do not tease the animals. Shouting, hissing, making faces, throwing things, running in front of the cage, waving sticks—such activities disturb and irritate animals. Animals will be a lot happier if the surroundings are quiet. Sounds that animals make can also be heard if silence is maintained.

Animals are very shy and sensitive and have their own routine. Some stay awake at night and sleep most of the day, and if visitors disturb the animals just because they want to see the animals moving around, it disturbs their routine. Some animals need privacy and may be hiding. If the animal is hiding, one can come back later and check. People often expect animals to be active all the time, as though the animal wanted to meet and react to them at that precise moment!

No Teasing

No person shall tease, molest, injure or feed any animal or cause disturbance to the animals by noise or otherwise, or litter the grounds in a zoo. A visitor who is caught teasing or feeding animals in a zoo can be punished with a fine or even jailed.

The Wildlife (Protection) Amendent Act, 1991. No. 44 of 1991 Section 38J Prohibition of teasing, etc. in a zoo.

Teasing is a major cause of suffering for zoo animals. Teasing causes mental stress. Even seemingly "harmless" teasing such as snapping fingers at the animals, calling, hissing, or running in front of the cage, may be irritating to the animals.

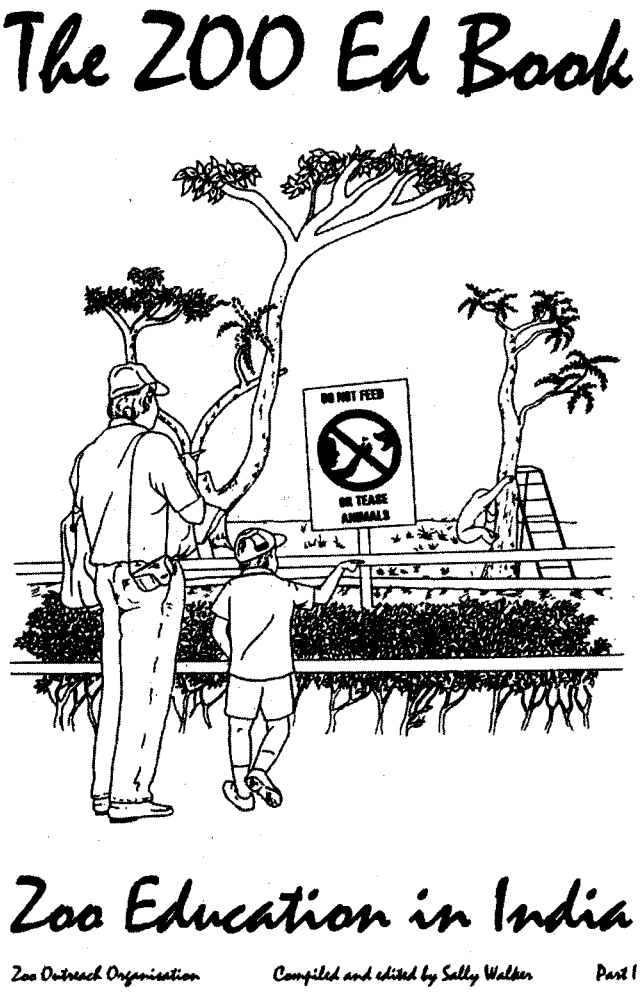
Other behaviours of the visitors like spitting and smoking can prove dangerous to animals. Bringing pets to zoos is also not allowed—the fear is that the zoo animal might catch some infection. All these acts can adversely affect the health of the zoo animals.

ZOO—Zoo Outreach Organisation

Zoo Outreach Organisation (ZOO) based in Coimbatore, Tamilnadu is a conservation, education and welfare NGO. It was founded in 1985 with a grant from the Department of Environment, Government of India, to provide technical and educational support for zoos, to enhance the public image of zoos, to liaise between local and national interests for the benefit of Indian zoos, and to lobby for organisation and legislation affecting zoos and animal welfare in zoos. Zoo Outreach Organisation(ZOO) was so named because its initial activity involved primarily zoos, and its purpose was to "reach out" to both the lay and conservation community and involve more people with zoos.

ZOO brings out with a monthly magazine called ZOO's PRINT, which deals with zoos, wildlife and wildlife welfare news. ZOO also brings out several other publications.

ZOO's philosophy is to cultivate the 3 C's of Conservation, Communication and Coordination and discourage the 3 E's of extinction—Ego, Envy and Elitism.



School Visits to a Zoo

Zoos are places which are frequently visited by school children. Often, zoo visits are considered just as picnics and are undertaken without any specific educational purpose in mind.

A zoo visit should not be treated as an isolated activity. With a little planning, a zoo visit can be both fun and educational. It is an opportunity to expose students to the amazing diversity of life and help them understand many of the ecological concepts and principles they have been learning in their textbooks.

Planning a Visit: Some Hints to Teachers

Some zoos allow free entry for school children one day in a week. A visit on that day could be planned. It would be a good idea for you to meet or talk with the zoo authority one or two weeks prior to the visit. Enquire about the educational activities of the zoo and ask if they can arrange some programmes for the students. Do not forget to send an official letter to the zoo regarding the visit. After getting confirmation from the zoo, inform the students and parents.

Students may not be in a mood to listen to lectures and talks during such a visit. Therefore, you will need to plan different kinds of activities to help realize the educational objectives. These may include games, quizzes, worksheets, exercises of observation, creative writing, etc.

You may also have to read up and do research on questions children are likely to raise during or after the visit. It is important to ensure while planning the programme that it is not too rigid, and that it allows the students to explore new things that they see. However, a framework programme is essential.

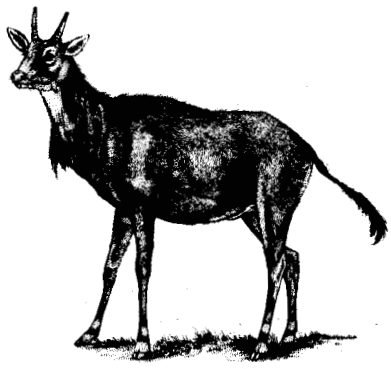
A properly planned visit can help to enrich and vitalise the experience students have in the zoo. It can provide the space for development of several skills including observation and investigation. The experience can be further strengthened if students are properly oriented before the visit about the purpose of the visit, and relevant concepts are introduced.

If you are bringing a single class, it would require a minimum of two teachers. Arrange for more teachers or volunteers if required. Co-ordinate with them and have a discussion on the programme. Plan name tags for students, if required.

It is very essential that there is adequate planning for turning such an opportunity into an educational experience. In such a situation, you need to play the role of a facilitator in the process of self-learning, rather than that of a traditional teacher.

Practical Tips

- The best time to go to the zoo is when the weather is cool. Avoid a hot day or try to go as early as possible, when it is still cool. If the zoo is large, spread your visit over two days, instead of one.
- If the group is large, divide into smaller groups of 15–20 students each.
- Too many activities will bore the students and they will not be able to grasp too many concepts in a single day.



Nilgai

Before the Visit

A preliminary visit to the zoo by the teacher is desirable in order to find out about the animals there, and the facilities offered by the zoo. Talk to the zoo staff regarding the visit by your school. Some zoos have special programmes for school groups. Find out whether the zoo has a room or an open area for conducting activities. Get an idea of the sections in the zoo, e.g., reptiles, birds or large mammals, so that you can plan relevant activities. After this preliminary visit, objectives can be set for the visit. For this, you would need to scan the curriculum to check which concepts can be supported by the visit.

The preliminary visit will give you an idea about the time that will be taken in seeing all the enclosures, the route to be taken and the availability of space to conduct activities, discussions or talks while on the round.

After this, you can plan the day's programme and the activities to be conducted at the zoo. The visit has to be planned so that students can observe and marvel at the animals, and of course, have fun. The activities you plan must be designed to help observation and consolidation of learnings.

Select and plan the activities according to your needs. Avoid having too many activities. It is not necessary to conduct the activities in the zoo itself. Activities can be as well be carried out before or after the visit, in the school.

A session on the purpose of zoos will be very useful before the visit. Have a discussion with the students on what to do and what not to do in a zoo, a day before the visit.

Before setting out for the visit, it is important to brief children again on where they are going, what they are going to do, what they can expect to see, what the objective of the visit is, what the plan is, etc. While the educational objective is being conveyed, it is important that the 'fun' element of the trip is also emphasized, so that the children are not put off.

'Do's and don'ts' for the visit need to be clearly spelt out to the children. It is important that they be given reasons for what they are being asked to do or not do, as this will help them internalize the behaviour.

Choosing Activities

Your visit can be theme-based. It could concentrate, for example, on a particular group of animals (on cats, reptiles, birds, etc.) or some ecological principle (prey-predator, inter-relationships, camouflage, etc.). (See the activities section)

During the Visit

At the site, the students need to be given enough opportunity and time to make observations and explore the facility. It is important to encourage them to discover and seek clarifications for their queries.

There are different ways in which such a programme can be planned. It depends on the zoo you are visiting, the number of students, and the infrastructure of the zoo. Some tips are given below.

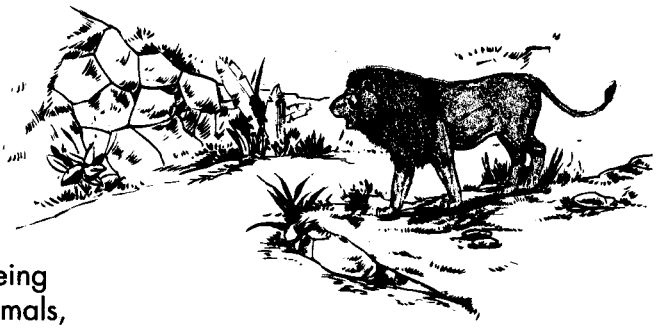
- If the group is large, divide into smaller groups.
- After each section, you can take a break and either conduct an activity or have a discussion, depending on the theme of your visit.
- Encourage students to read the information on the sign boards near the enclosures and discuss this with them as you walk around the zoo.
- Facilitate the students in interacting with the keeper and get information about the routine, the food, the behaviour of the animal.
- Encourage students to observe different types of enclosures.
- During the visit, stress the purpose of having zoos.
- Many zoos have quite an amount of vegetation both inside the enclosures and outside. Explain the importance of the vegetation to the students.
- Remind the students to take down notes.

Sometimes overplanning can be as bad as underplanning. Even a properly planned visit might not happen smoothly. Prepare a flexible plan so that it is easy to change depending on the situation. For example, the weather may change suddenly. It could become too sunny or it might even rain. In this case, you might need enough indoor activities like colouring and creative writing. You may also find the zoo crowded on that particular day, which could cause difficulty in carrying out activities.

It is not always easy to see some animals such as bears, porcupines or some birds which may be hiding. The activities focussed on observation of these animals may possibly not happen. Try and explain the reasons why animals hide during the day time.

After the Visit

In order to consolidate the learnings from the visit, follow-up activities back in the classroom are very necessary. Such sessions may include discussions, question and answer sessions, quiz, writing a trip report, etc.

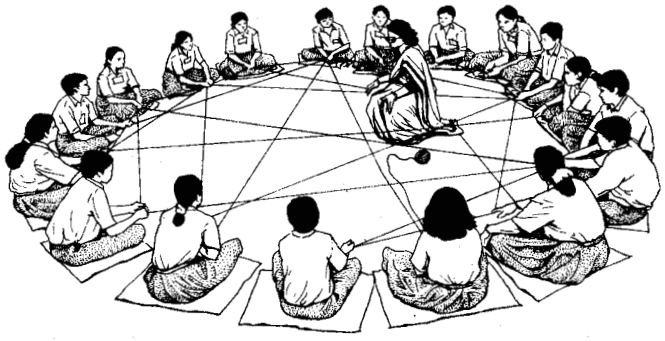


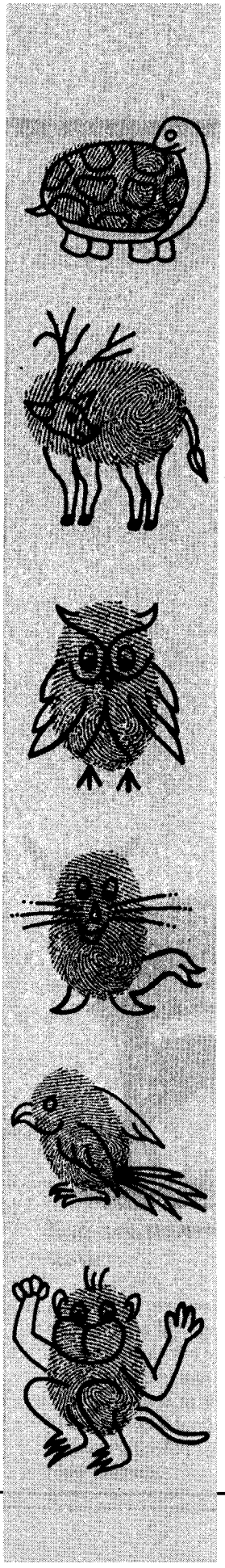
The experience of the students' visit could also be discussed in the context of particular lessons being taught in different subjects, e.g. food habits of animals,

camouflage, etc. in the science class; nature poetry in language class; habitats of animals in the geography class, etc.

Games can be used in reinforcing learnings. 'Who am I?' is useful to recapitulate and classify all the creatures that students saw at the zoo. 'Oh! Deer' can help students to understand how the animals they saw in captivity would behave in nature. A debate on whether zoos are good or bad would help examine other dimensions of the subject. Students can do some of the same activities that were done before the visit. This will give you feedback on whether the concepts were grasped or not. (See Activities for menu of activities).

Continue referring to the experiences of the zoo visit in the subjects you are teaching, whether science, arts or maths.





SECTION II
WORKSHEETS

1 Wild Facts

Mammals

Mammals belong to a large group of animals called vertebrates. They have a bony backbone called a vertebral column. Whether their necks be short or long, almost all mammals have seven vertebrae in the neck.

Mammals are warm blooded or endothermic. This means their body temperature remains almost the same all the time, even if the temperature around them changes.

Mammals are the only animals with hair or fur. This may range from thick coats of fur to a few tufts of hair, as in rhinos and whales.

Mammals give birth to live young except in the case of three species which lay eggs.

Mammals feed their young on milk produced in their mammary glands. It is these glands that give mammals their name.

Mammals have a heart that is divided into four chambers. This helps efficient metabolism and allows them to be more active than reptiles and fish. Almost all mammals have teeth but the type, arrangement and number of teeth vary from species to species. The specialization of teeth helps mammals to feed on a variety of food and obtain it in a variety of ways.

Blackbuck with fawn

Mammal skin has many different kinds of glands— mammary, oil, scent and salivary glands.

Mammals have outer ears to help catch sound waves and funnel them into the middle and inner ear.

Mammals are found almost everywhere—on land, in trees, under the soil, in water.

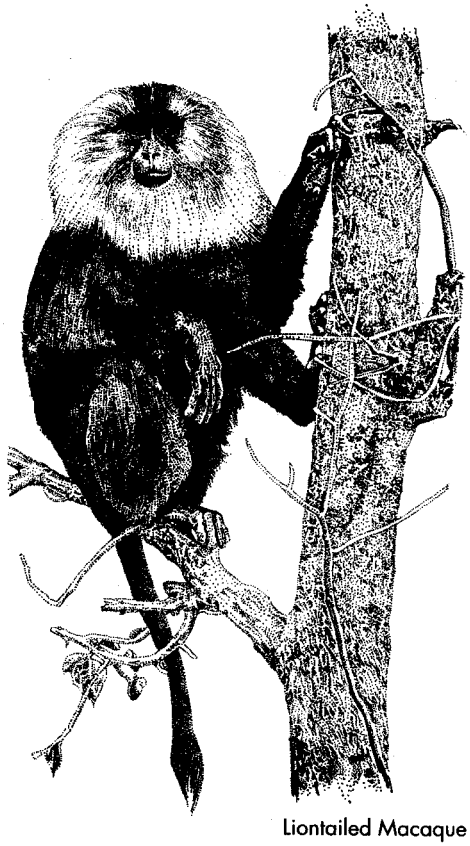
Mammals are classified into different orders based on similarities in anatomy, physiology and characteristics shared with others in that group, e.g. arrangement of teeth, how it bears its young, etc.

Mammal Watch Worksheet

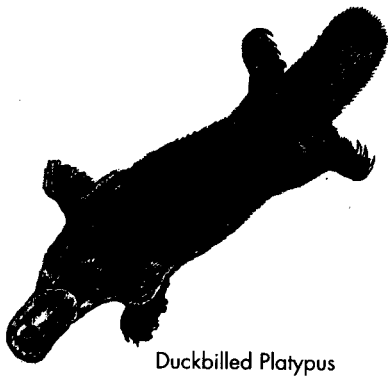
1

Look out for, and name two mammals each that

- swim
- burrow
- hunt
- gnaw
- live in trees
- have hoofs
- have claws
- have a pouch
- have a lot of hair
- have little hair
- have a short tail
- have a long tail
- feed on plant matter
- feed on other animals
- feed on plants and animals



Liontailed Macaque



Duckbilled Platypus

Egg-ceptions to the Rule

A group of mammals called Monotremes lay eggs instead of giving birth to live young. The duck-billed platypus and spiny anteater called echidna belong to this group. Monotremes live only in Australia, Tasmania and New Guinea.

2 Wild Facts

Birds

Birds belong to the group of animals called vertebrates. They make up a special class of vertebrates called *Aves*. *Aves* is the Latin word for bird.

Birds are warm blooded (endothermic). They maintain constant body temperature even if the temperature around them changes. They do not have sweat glands so they cannot sweat to cool off.

Birds are the only animals with feathers. Birds have several different types of feathers from stiff contour feathers which cover the wings and body, to fluffy down feathers which help to insulate the birds and keep them warm. Feathers help to protect the bird's sensitive skin, and keep the bird warm and dry. They also form brightly coloured crests and tails.

Scops Owl

In most birds, the eyes are located on the sides of the head and can focus independently of each other, so that birds can see two different images at the same time. In some birds such as owls, the eyes face forward.

All birds have wings, even ostriches, penguins and other flightless birds. The wings help birds to fly through the air. The size and shape of wings differs. Birds walk on two legs.

Most of a bird's bones are hollow or partially hollow for lightness, and some have very thin bones (struts) inside for support and strength.

All birds lay eggs and most birds incubate their eggs or keep them warm with the heat of their own bodies.

Birds have an efficient breathing system made up of two lungs with special balloon-like air sacs. These air sacs attached to each lung spread to different parts of the bird's body.

Bird have a keen sense of sight and hearing, but a poor sense of smell. Most birds have large eyes that can focus sharply on both nearby and distant objects. Birds use their keen eyesight to find food, keep an eye on predators, etc. One usually can't see a bird's ears because in most birds they are just small holes covered with feathers. They are located on either side of the head, just below and at the back of the eyes.

Birds are toothless, but all have beaks. Each type of bird has a different type of beak, depending on the type of food it eats.

Birds' feet, especially their toes, come in a variety of shapes and sizes. Each type of foot is well suited to how and where a bird lives— for example, swimming birds have different type of feet from climbing or running birds.

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In most birds, the eyes are located on the sides of the head and can focus independently of each other, so that birds can see two different images at the same time. In some birds such as owls, the eyes face forward.

All birds have wings, even ostriches, penguins and other flightless birds. The wings help birds to fly through the air. The size and shape of wings differs. Birds walk on two legs.

Most of a bird's bones are hollow or partially hollow for lightness, and some have very thin bones (struts) inside for support and strength.

All birds lay eggs and most birds incubate their eggs or keep them warm with the heat of their own bodies.

Birds have an efficient breathing system made up of two lungs with special balloon-like air sacs. These air sacs attached to each lung spread to different parts of the bird's body.

Bird have a keen sense of sight and hearing, but a poor sense of smell. Most birds have large eyes that can focus sharply on both nearby and distant objects. Birds use their keen eyesight to find food, keep an eye on predators, etc. One usually can't see a bird's ears because in most birds they are just small holes covered with feathers. They are located on either side of the head, just below and at the back of the eyes.

Birds are toothless, but all have beaks. Each type of bird has a different type of beak, depending on the type of food it eats.

Birds' feet, especially their toes, come in a variety of shapes and sizes. Each type of foot is well suited to how and where a bird lives— for example, swimming birds have different type of feet from climbing or running birds.

Feathered Friends Worksheet 2

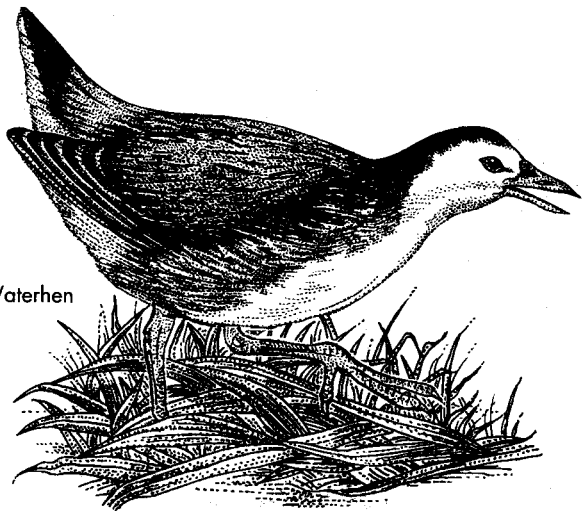
Look around and name:

- Two birds with red beaks
- One bird with a curved beak
- Two birds with long tail feathers
- Two birds with eyes on the sides of the head
- One bird that was preening
- One bird with webbed feet
- Two birds with feet that have three toes facing forward and a long hind toe.
- One bird with two toes facing forward and two toes in the back.
- Two birds with short conical beaks
- One bird that was making some sound.

Choose any one bird. Describe/draw:

- The colour of its feathers
- The placement of its eyes
- The size and shape of its beak
- The size and shape of its legs/feet
- What it was doing
- What food was in its cage
- What kind of sound it was making

Paradise Flycatcher



Whitebreasted Waterhen

Wild Facts

Reptiles

Reptiles are members of the class *Reptilia*, which has 6500 species.

Reptiles are cold-blooded or ectothermic (depending on outside heat). They cannot generate body heat internally by regulating their metabolism like warm blooded or endothermic animals.

Reptiles rely on external heat (i.e. the sun) to function.

Temperature control (warming up and cooling down) is done by strategies such as basking, exposing maximum surface area to the sun, burrowing, seeking shade, immersing in water, etc.

Reptiles are covered with almost waterproof skin with scales. They are generally glandless.

Unlike birds and mammals, reptiles continue to grow until they die. When the outer skin becomes too tight, it is shed and is replaced by the new one that has developed inside. This process is called moulting.

The frequency of moulting depends on the diet, age and health of the reptile.

Snakes shed their skin in one piece. Lizards often shed their skin in patches.

Most reptiles lay eggs which have a protective waterproof cover or shell.

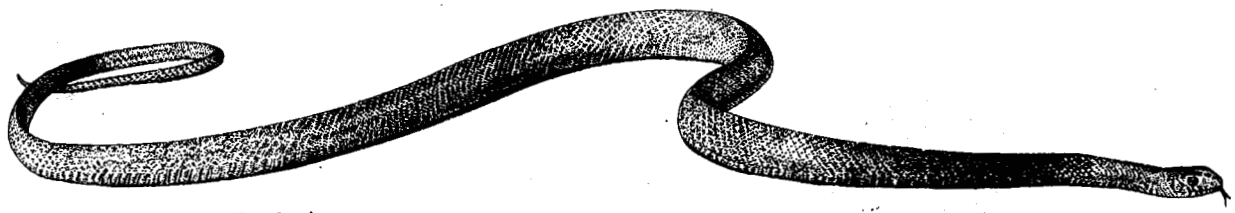
Reptiles are born on land.

Some reptiles have limbs that project from the sides of the body (lizards). In some, limbs are reduced or absent (snakes). The word reptile comes from the latin verb 'to crawl'.

There are three main orders of reptiles living today.

Chelonia – turtles and tortoises
Crocodilia – crocodiles and alligators
Squamata – lizards and snakes

A fourth group, *Rhyncocephalia* includes only one species—the tuatara—found only in the New Zealand islands.

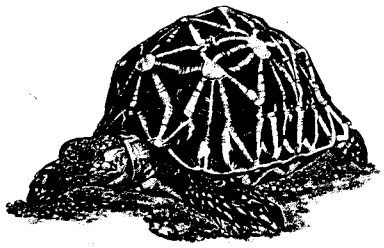


Rat Snake

Reptile Watch Worksheet 3

Look out for and name:

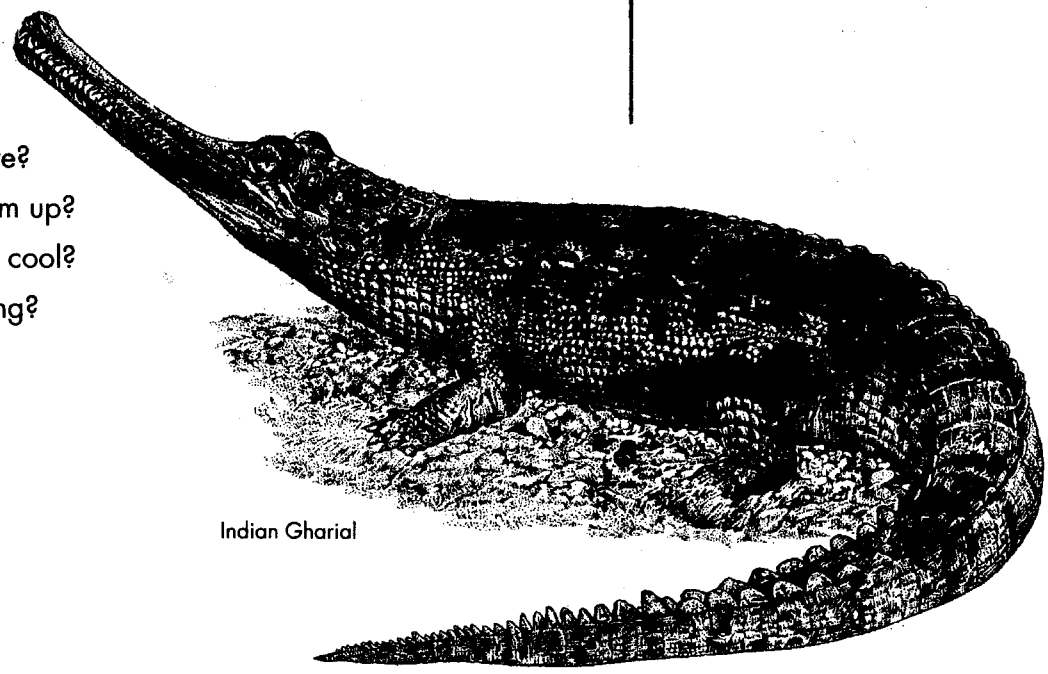
- Two reptiles with four legs
- Two reptiles with no legs
- One reptile that swims
- One reptile that crawls
- One reptile that walks
- One reptile with claws
- A reptile on which you can see a scaly covering
- A reptile that has a shell
- A reptile with a big tail
- A reptile with a small tail



Star Tortoise

Observe any one reptile. Describe:

- Its skin/cover
- Its colour and pattern
- Size
- Eyes
- Teeth
- How does it move?
- How does it warm up?
- How does it stay cool?
- What was it doing?



Indian Gharial

4 Wild Facts

Animal Senses: Eyes

Many animals that live on land, whether they are hunters, or hunted, have developed good eyesight. They also possess keen senses of smell and hearing.

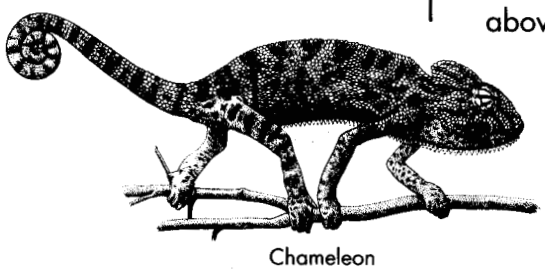
Birds have the sharpest eyesight. They can focus sharply on both nearby and far away objects. They are capable of seeing for great distances. As they fly at a height, they can scan a large area of land. In most birds, the eyes are located on the side of the head, and can focus independently of each other so that a bird can see two different images at the same time. This is called monocular vision. When they focus straight ahead, birds have binocular vision with both eyes focussing on the same image. Animals with binocular vision can judge distance better than those with monocular vision. Some birds such as owls have binocular vision most of the time as their eyes face forward. Bird's eyes are relatively fixed in their sockets so they cannot roll them around as we can. Birds have to turn their heads to see in different directions. That is why we see birds twisting and cocking their heads.

Burrowing animals have relatively poor eyesight. But this is compensated by a keen sense of smell, as in moles, or sensitivity to vibrations in soil, as in worms.

Bats' eyes are not very efficient but they have a well developed system of sonar reflection which helps them to reach their prey.

Most snakes are near sighted; they depend partly on their sense of smell to avoid predators. The large eyes of many snakes can see well but it is their flickering tongue that usually helps to locate prey. Most snakes have round eye pupils. Lizards have eyelids, although these may be fixed in the form of a transparent scale.

Crocodiles have raised eyes and nostrils so that these remain above water even when the rest of the animal is submerged.



Chameleon

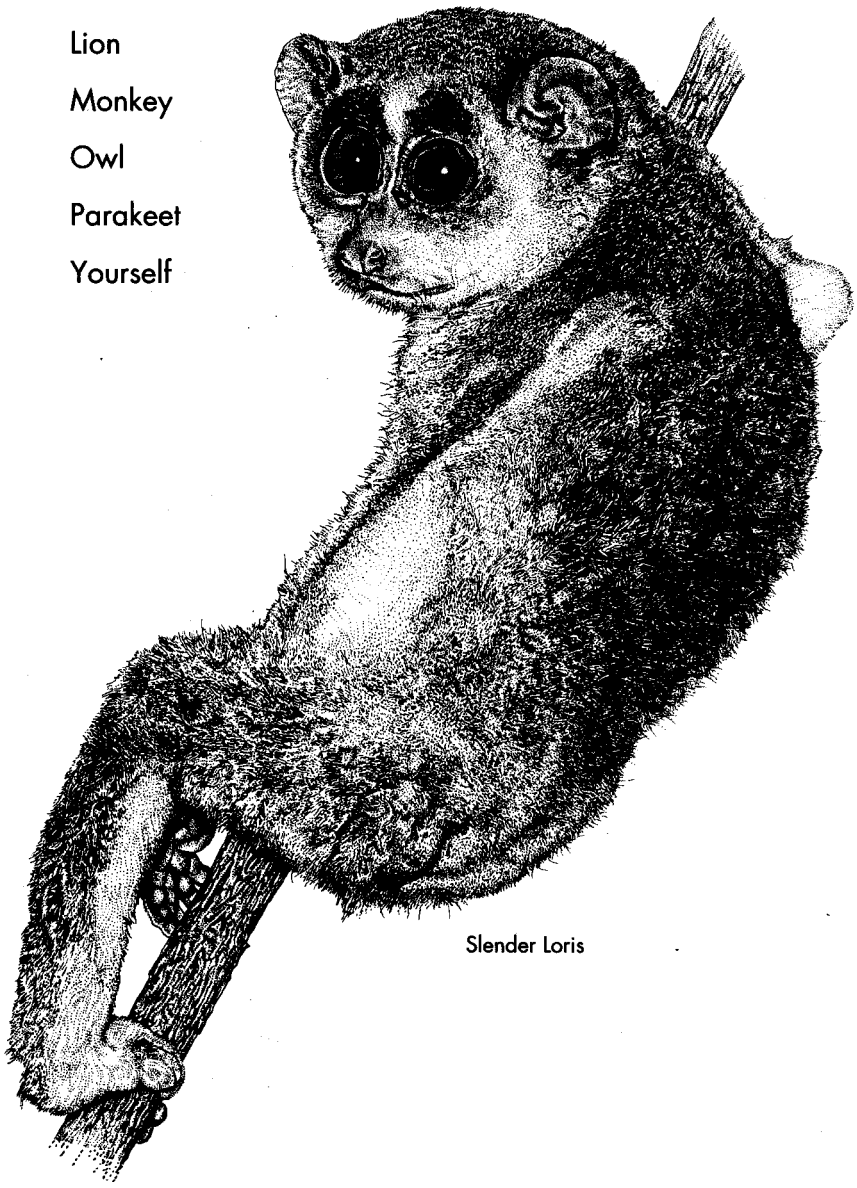
Chameleons have unique eyes that whirl around independently of each other—looking up, down, forwards and behind, searching for insects and spiders.

Most fishes have well developed eyes but no eyelids.

Eye-Spy Worksheet

Look for and name:

- 3 animals with eyes in front of their face.
- 3 animals with eyes at the sides of the head
- 1 animal with slit-like pupils during daytime
- 1 animal with eyelashes
- 1 animal with eyes at the top of the head
- 2 animals with bulging eyes
- The colour of the iris of
  - Lion
  - Monkey
  - Owl
  - Parakeet
  - Yourself

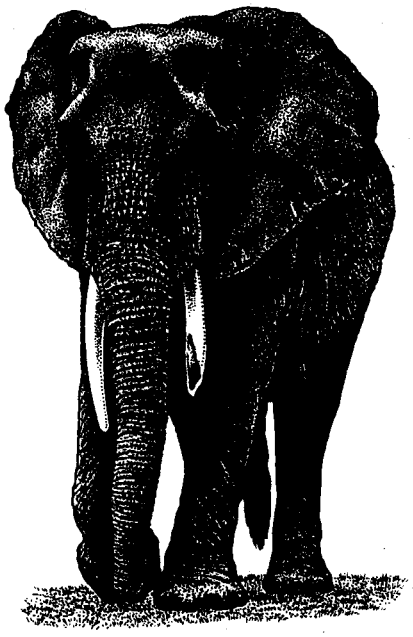


Slender Loris

If a human can read a book from a distance of 1.5 m, a mouse could from 10 mm, a dog from 3 m, a bird of prey from 7.5 m.

Source: Twycross Zoo Teacher's Pack

Wild Facts



African Elephant

Animal Senses: Ears

Unlike other types of animals, mammals have outer ears to help catch sound waves and funnel them into the middle and inner ears. Most mammals have a good sense of hearing and can pick up sounds easily.

Bats and many mice communicate with sounds that are several times higher in pitch than humans can hear. Mammals use their hearing and sound signals to interact with each other—for communication within the group, as an alarm call or danger signal, or to attract potential mates.

Ears also act as a means of keeping cool because they radiate body heat. Generally speaking, tropical mammals have large ears as compared to similar species in cold regions. The elephant is an example— the African Elephant has larger ears than the Asian Elephant.

Birds' ears are not usually visible because in most birds they are just small holes covered with feathers. The ears are located on either side of the head, just below and behind the eyes. Most birds have very keen sense of hearing. They depend on this sense to find prey, detect danger and find breeding partners. Owls and other night flying birds have especially good hearing.

Snakes were believed to be totally deaf since they have neither ear drums nor ear openings. But snakes 'hear' by responding to surface vibrations. Lizards have easily identifiable ears.

Crocodiles have a sharp sense of hearing. Fishes have no external ear but they have an internal ear which can receive sound waves conducted through water.

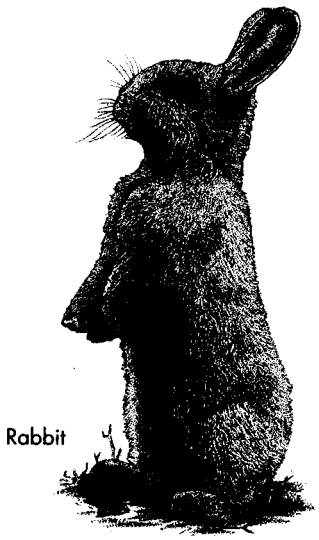
We Are All Ears Worksheet

5

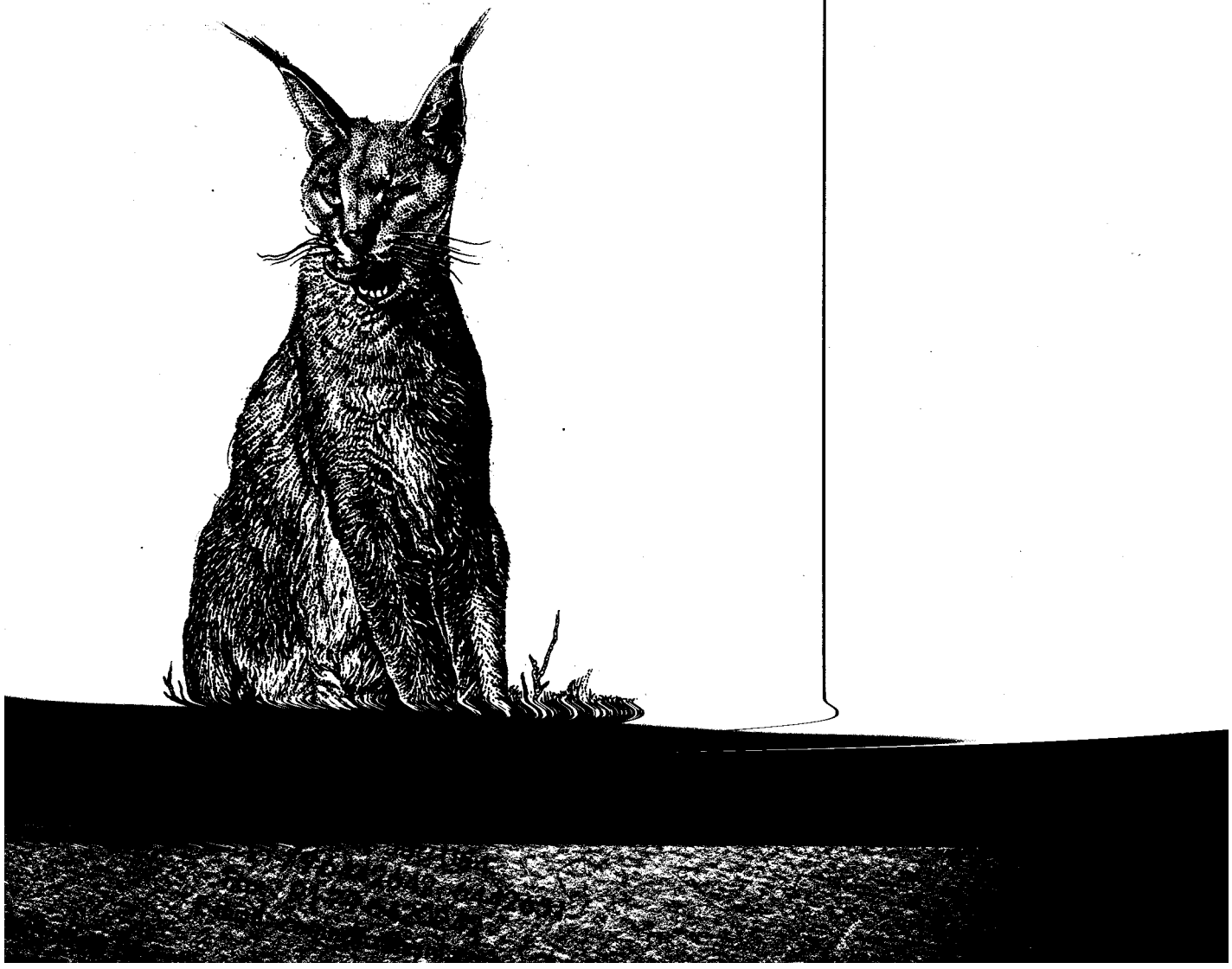
Look for and name:

- 2 animals with flap-like ears
- 2 animals with ears on top of the head
- 2 animals with furry ears
- 2 animals with no ears
- 2 animals in which you cannot see the ears
- 2 animals with ears on the sides of the head
- 2 animals who were twitching their ears

Sketch five pairs of ears—each of a different shape or form. Label each sketch with the name of the animal to whom the ears belong.



Rabbit



Wild Facts

Caracal

Camel

Goat

Buffalo

Bat

Hedgehog

Limbs and Toes

All vertebrate limbs, including our legs and arms, are based on the same bone structure and have the provision of five toes or digits. But during the course of their evolution, some animals have lost or reduced the number of digits.

Different mammals have characteristic foot structures adapted to their peculiar characteristics, habits, and habitats. Just as the shape of the foot varies in different mammals, so do the shapes of nails, claws and hooves. Some mammals like porcupines, bears and humans press their whole foot–heel and toes–on the ground when walking.

Mammals with hooves (a hoof is like a thick toenail) walk on their toes e.g. cows, buffaloes, horses, donkeys, goats. But the number of toes varies. Cattle, camels and donkeys have two toes, but horses have only one. Rhinos have three toes, whereas hippos have four. Animals specializing in running fast (deer, antelope) have small narrow feet.

Mammals with paws (dogs, cats, foxes, tigers, cheetahs) run mainly on their toes, with greater pressure on the forward part of the paw. These animals have claws on their paws. Cats, tigers and lions sheathe their claws into folds of skin when they walk or run. Their claws are said to be retractable.

The claws of digging animals such as moles are usually large, sharp and strong to help them dig deep into the soil.

Climbing animals like squirrels have hooked claws which help them grasp a branch or cling to a flat surface. Squirrels have sharp claws and can swivel the whole back foot around at the ankle so that it points backwards. This enables it to hang head down from an almost vertical surface on a tree trunk.

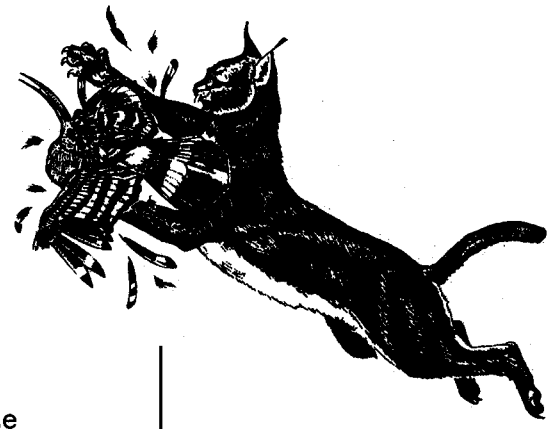
Monkeys have grasping paws for tree climbing. They generally walk on the front of their paws without touching the heel to the ground.

Birds have two legs and a number of different arrangements of toes.

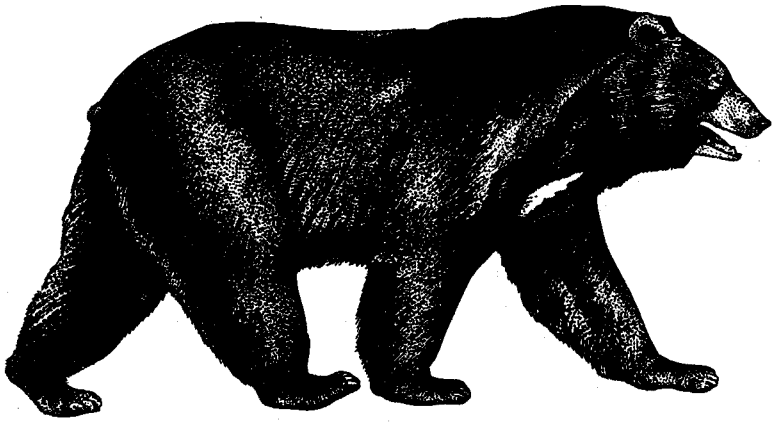
Most reptiles have four legs/limbs. Snakes have no limbs. Crocodiles can walk slowly with the trunk raised above the ground; they also shuffle along on their belly, using legs as propellers.

TipToesWorksheet 6

Look around and name:

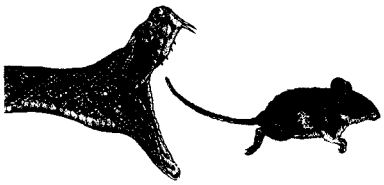


- 3 animals that walk on two legs
- 4 animals that walk on four legs
- 4 animals with hooves
- 4 animals with paws and claws
- One animal with broad cushioned feet
- 2 animals that walk on the tips of their toes
- 2 animals that walk with the whole foot pressed to the ground
- 2 animals with small narrow hooves
- One animal with three toes
- One animal with flippers



Himalayan Black Bear

Wild Facts



Teeth and Mouth

In a food chain in an ecosystem, materials must move from plants to herbivores, from herbivores to carnivores, and then through decomposers back to the soil. The movement from one link in the chain to another is through the mouth.

Mammals have specialized teeth for eating different kind of food. There are three basic types of mammal teeth: incisors or small cutting front teeth; canines for seizing holding and tearing; premolars and molars for crushing grinding or tearing food.

Grazers such as cows and sheep have a few incisors for snipping grass, and large, flat grinding molars for chewing the grass. They have wide muzzles to harvest grass. Browsers have delicate snouts to select single leaves from shrubs and trees. Meat eaters have large, sharp canines for stabbing and holding prey. They have strong molars to crush bone and cut flesh, and sharp incisors to scrape and tear away flesh from bones.

Gnawing animals like squirrels and rats have chisel-shaped incisors to gnaw hard-shelled nuts and seeds, and barks of trees. They have pointed faces and tiny mouths.

Mammal teeth are replaced only once when permanent teeth replace milk teeth.

In most fishes, amphibians and reptiles, lost or worn out teeth are continuously replaced.

In reptiles, the jaw structure and muscle system are designed to grip prey. Crocodiles have trap-like jaws hinged to open and shut. Crocodiles have large numbers of pointed teeth but the teeth are not suitable for tearing up food. The crocodile usually holds its prey for a while, then shakes it till a part breaks off. The powerful jaws reduce the food to a size fit to swallow. The food is further broken up in its stomach.

The gharial has a long snout with needle–sharp teeth which help to trap fish as the jaws sweep from side to side. Turtles and tortoises do not have teeth but the edges of their jaws are very sharp and bony and help them to eat plants and animals.

Most snakes have flexible ligaments and joints that allow the two halves of the lower jaws to move apart during swallowing. Many snakes swallow prey. Venomous snakes inject venom by means of teeth modified to form fangs.

Snip, Grind and Chew Worksheet 8

Look around and name:

- 3 animals that have prominent canine teeth
- 2 animals that are grazers (eat mostly grasses)
- 2 animals that are browsers (eat leaves, twigs and barks of shrubs and trees)
- 2 animals that have teeth for gnawing
- 2 animals that swallow their prey
- 2 animals that do not have teeth
- One animal with a flexible jaw
- One animal that eats insects
- One animal that eats fruit
- One animal with a mouth pouch for storing food
- The animal with the longest teeth

Find out from the animal keepers:

The feeding routine and menu for one mammal, one reptile and one bird at the zoo.

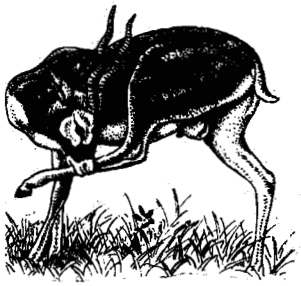
Wild Facts

Comfort Movements

In addition to sleeping and feeding, there are a number of other activities that animals engage in. These take many forms. They are generally grouped together as 'comfort movements'.

Grooming: These are activities carried out by mammals to keep their hair/fur in good order and the skin free from parasites.

Different animals have different patterns of grooming. Dogs lick forepaws and genitals, and nibble the fur and claws of their hindfeet with their incisors. Cats lick or "wash" their entire body. Rabbits groom their ears by licking their forepaws and running them over the ears over and over again. Some mammals have special claws or teeth that they use as "combs" for removing parasites and flakes of dead skin, and keeping the fur untangled. In some species, especially monkeys, they all groom each other in a group. This is known as allogrooming.



Preening: This is the way birds keep their feathers neat and clean. Using its beak, the bird starts at the base of the feather and works outwards either in tiny pecks or in a continuous movement. These actions help to remove parasites or foreign bodies, and rearrange the feathers.

Scratching: Some birds scratch their head with the foot. The head is the only part they cannot reach with their beak when they preen. Claws on the hind foot or hind hoofs are used by mammals, especially small mammals, to scratch, especially the head, and sometimes the flanks. Large mammals usually use a tree trunk, rock or other surface to rub against.

Bathing: This is a regular ritual with birds. Water birds bathe while floating on water, dipping the head and shoulders and throwing water over the back, followed by beating the wings vigorously on the surface and splashing water. Land birds bathe standing in shallow water. They dip head and shoulders first, followed by tail and rear. Bathing is always followed by preening, in all birds.

Some birds use dust instead of water for cleaning. Birds make a saucer-shaped depression on dry ground, using feet and body. They use feet to throw dust into ruffled feathers, and then vigorously shake the body. Horses, asses, zebras and dogs also like to vigorously roll in the dust. After they get up, they shake their coat. Reptiles and amphibians do not water bathe or dust bathe, though they may lie in water.

Feel Good Worksheet

9

Look around and note down the names of:

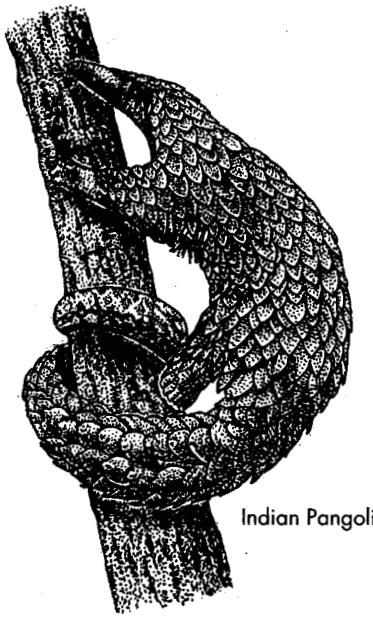
- Mammals whigh were grooming by licking
- Mammals which were grooming by use of claws or teeth
- Mammals which were grooming each other
- Birds having a bath
- Birds having a dust bath
- Birds which were preening
- Birds which were scratching
- Birds which were drying their feathers
- Reptiles which were sunbathing
- Mammals which were wallowing

Cormorant drying

When birds sunbathe, they settle in a crouching position, fluff feathers, droop wings and spread the tail, exposing the maximum surface to the sun's rays. Even typically night birds such as owls sunbathe, with eyes closed.

Mammals enjoying lying in the sun. Lizards spread their ribs, flatten their bodies and turn at right angles to the catch the maximum sunlight.

10 Wild Facts



Indian Pangolin

Classification is the grouping together of animals or plants based on their common descent, common features and natural relationships. The science of classifying organisms is called taxonomy. (For more on classification see page 54.)

There are many ways in which animals in the zoo can be classified. The most common way in which animals in zoos are organized is according to whether they are mammals, birds, or reptiles. Thus zoos generally have a mammal section, bird section, reptile house, etc.

Even within these, students can distinguish animals in a number of different ways. For example, by:

Size	: From elephants and rhinos to hares and hedgehogs.
Colours/patterns	: Covering a great range and variety.
Body covering	: Hair and fur, feathers, scales.
Body parts	: Tails, beaks, feet, eyes and ears, even teeth.
Food habits	: Meat eaters, grass eaters, insect eaters and omnivores.
Locomotion	: Crawling, jumping, climbing, pacing, flying.
Habitat in the wild	: Forest, grassland, desert, mountains, oceans.
Origin	: Animals that are indigenous to our country and those that belong to other parts of the world.

Some of these similarites and differences can be noted by observation.

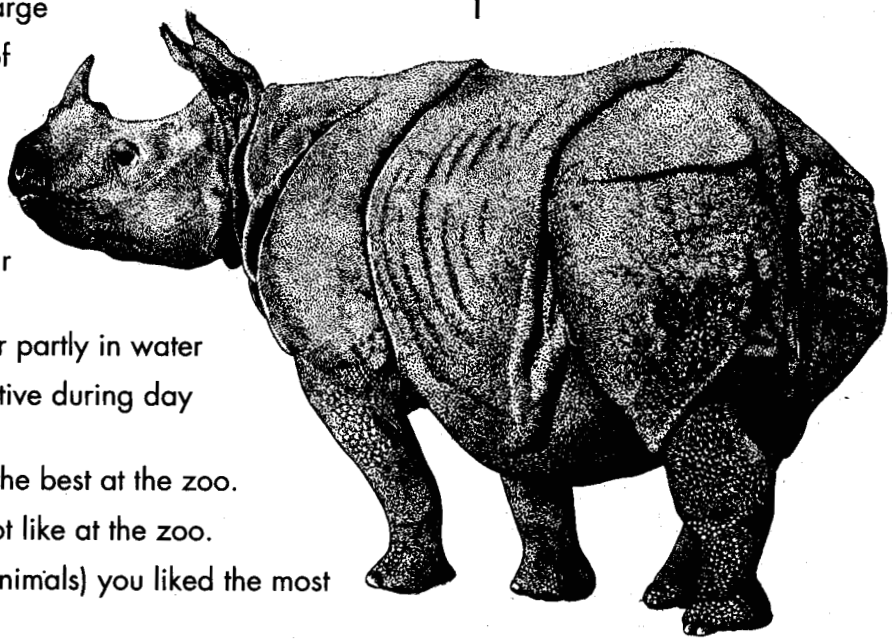
Two in the Zoo Worksheet

10

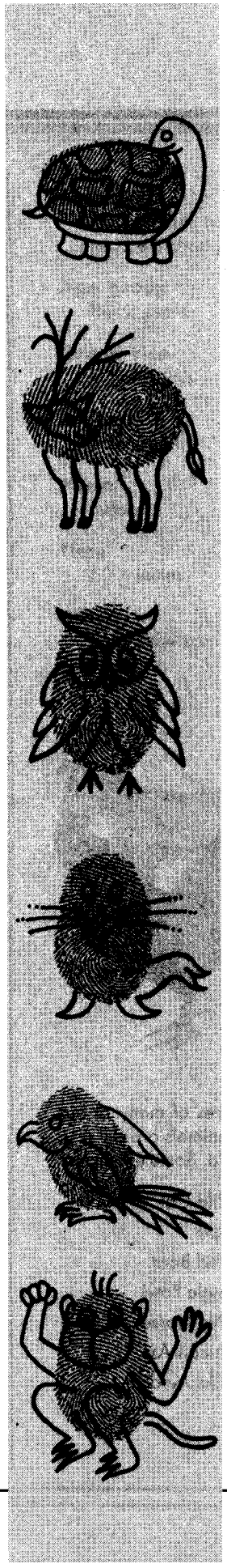
As you walk through the zoo, try to find the following and note down their names.

Note: Animals refers to mammals, birds and reptiles.

- Two animals that have stripes/spots on their body
- Two animals that have horns
- Two animals that crawl
- Two animals that lay eggs
- Two animals that have webbed feet
- Two animals that are herbivores
- Two animals that are carnivores
- Two animals with long tails
- Two animals that have hair on their bodies
- Two birds that have colourful feathers
- Two animals that have been brought from other countries (read the signage)
- Two animals that move slowly
- Two animals that can run very fast
- Two animals that are very large
- Two animals that make lot of sounds
- Two animals that live in burrows
- Two animals that have spines or thorns all over their body
- Two animals that live fully or partly in water
- Two animals that are not active during day time
- Two animals that you liked the best at the zoo.
- Two animals that you did not like at the zoo.
- Two things (other than the animals) you liked the most in the zoo
- Two things (other than the animals) that you did not like in the zoo.



Great Indian Onehorned Rhinoceros



SECTION III
ACTIVITIES

1 Wild Facts

Wild in the context of an animal refers to any animal that lives in a basically free condition, providing for its own food, shelter, and other needs in an environment that serves as a suitable habitat. Wildlife thus refers to animals that are not tamed or domesticated. Domesticated animals are those which humans have tamed, kept in captivity and bred for special purposes.

Wildlife may be small organisms only visible to humans if seen through a microscope, or as large as a whale. Wildlife includes, but is not limited to, insects, spiders, birds, reptiles, fish, amphibians, and mammals, if non-domesticated.

All domestic animals have their origins in wild ancestors. Cattle used for food and other products, sheep for wool and other products, as well as dogs, cats, birds, fish commonly kept as pets are all examples of domesticated animals.

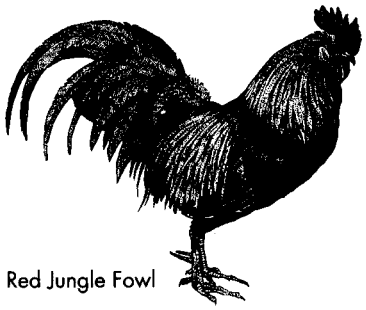
The process of domestication takes place over a long period of time. About 8500 years ago, cattle were domesticated in Europe, India and the Middle East. Tibetans domesticated the yak. Goat and sheep were first tamed because their meat was good to eat. Later, people learned to use their fur, skin, wool for clothing and shelter. Origins of domestic cattle are uncertain but it seems likely that the long-haired wild auroch is one of the ancestors of modern cattle.

The domestic horse has been living in association with man for more than 4,000 years. There is only one wild species of horse surviving in the world today. This is Przewalski's or Mongoloid Wild horse which survives in the cold plains of Mongolia in Central Asia. Horses were tamed for meat. People then learned to ride tamed horses, and used them to carry and pull loads.

Camels were tamed for riding and pulling loads in Arabia. Donkeys carried loads in northern Africa about 5000 years ago. Cats were tamed by ancient Egyptians, who used them to protect their storehouses of grains from mice and rats.

Pigeons were first tamed about 5000 years ago. People living near Mediterranean Sea raised pigeons for food. Chickens were first raised in Southeast Asia.

In the twentieth century, dogs and guinea pigs, mice and other rodents have been used in experiments to increase knowledge about many diseases and their treatment, or as the source of drugs.



Red Jungle Fowl

The wild relatives of many of our domesticated animals are still also found in the wild. Some examples:

Cat	– Wild Cat
Dog	– Wolf
Pig	– Wild Boar
Chicken	– Jungle Fowl
Horse	– Wild Horse
Donkey	– African Ass
Cattle	– Wild Auroch

What's Wild ? 1

Objectives

To help students distinguish between wild and domestic animals. To make them aware that wildlife exists in a wide variety of shapes, sizes, and forms.

Activity

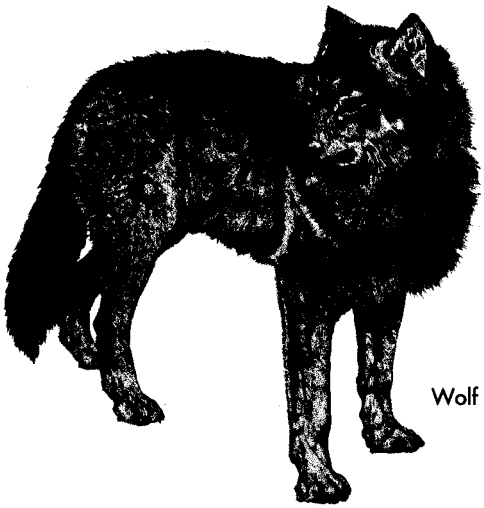
Ask the students to collect at least two pictures each of animals from old magazines and newspapers and bring them. Those good at drawing can draw and colour the animals. Let them pool all the pictures together and then classify them into two categories—wild and domesticated. Ask the students to make two collages, one of wildlife and one of domesticated animals. You can exhibit your posters in your classroom.

Extension/Variation

You could get the students to work in pairs or smaller groups and several other collages can be made, e.g. give the students a list of domestic animals and, ask the students to find out a distant relative of each animal that still lives in the wild.

After a visit to the zoo discuss how the animals in the enclosures, while they they were not in the wild, are also not 'domesticated'. Talk about how zoos are places where we can get a chance to see animals that we would not be normally be able to. Also discuss what is the habitat, food etc. of each of these animals in the wild. Extend the discussion to why it is important to design enclosures which are close to the natural habitat of the animals.

Based on What's Wild, *project Wild.*



Wolf

Materials
Magazine or newspaper pictures, chart paper, glue.

Age group
8–12 years

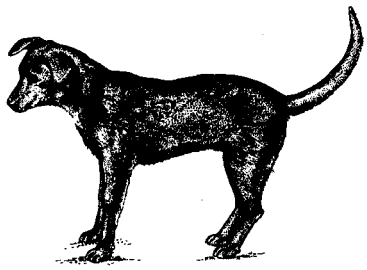
Group size
Whole class

Subject
Science, Art

Place
Indoors

Time
60 minutes

When
Before the zoo visit



Domestic dog

2 Wild Facts

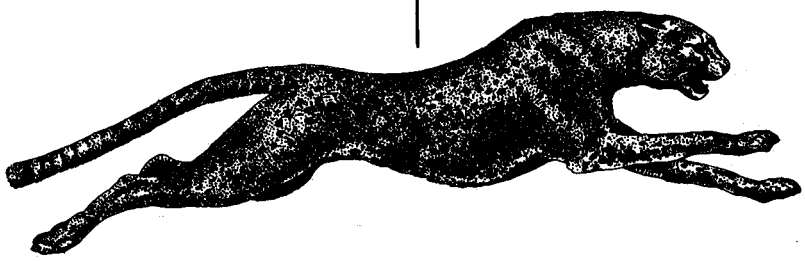
Symbols and images of wildlife have been used to advertise a variety of different products. There are a number of advertisements in newspapers, magazines and television where we find images of wildlife. Advertising uses images of nature and wildlife because they appeal to people's emotions. The main purpose of advertising is to evoke a response which will lead to more people buying the advertised product.

Advertisements use images of wildlife because they supposedly represent certain qualities which advertisers want to emphasize as the qualities of the product they are marketing.

Given below are some examples of popular products that use images of wildlife in their advertisements.

Cat	– Battery cells
Lion	– Television
Rhino	– Tyres
Elephant	– TV, Cement, Adhesive
Tortoise	– Mosquito coil
Penguin	– Refrigeration
Tiger	– Tea
Dove	– Toilet soap
Honey bee	– Honey
Cheetah	– Motorcycle

Some advertisements use stereotype images such as elephants or rhinos to project strength, doves to project purity and gentleness, deer or cheetahs to portray speed, etc. However, some of these may also portray negative stereotypes, or portray images of wildlife in an unrealistic or unnatural way, e.g. snakes as always being dangerous or harmful, talking birds, etc. These may promote the wrong messages with respect to environment. It is important to discuss these divergent aspects and sensitize students so that they become discerning consumers.



Wild Ads

2

Objective

Students will identify wildlife used in advertisements and understand why images and symbols of wildlife have been used to advertise the products.

Activity

Ask the students to bring the cuttings of advertisements from newspapers and magazines which use images of wildlife. Remind them to also look for trademarks, logos and product advertisements which use wildlife as symbols. Also let them find out products using the names of the animals and birds. If the students do not get any pictures, ask them to list down the names of the products which carry the names of the birds, animals, trees etc. Students may also list TV commercials that use wildlife images to sell products.

Start a discussion by asking the following questions.

- Why are animals/birds used for advertising products?
- Do they think the pictures of wildlife or the wildlife itself should be used in advertising?
- Why do they think that particular creature is used as a symbol or logo of the product?
- Does the ad portray the animal/bird in an accurate realistic or positive way, or is it portrayed inaccurately or negatively?
- What feelings does the ad evoke?

Extension/Variation

Ask students that if they were given a project to design a logo based on wildlife, which product would they choose and which creature would they choose to advertise it, and why? Students can work singly or in groups. Alternately, each group/student can be given a product, for example, a cosmetic, soft drink, automobile, pain killer, etc. Tell them to draw a logo for their product. The logo should contain a symbol of any wildlife that they think is suitable for the purpose and should have a name and a slogan.

After they finish, students can present and explain why they have chosen that particular wildlife symbol to advertise the products.

Materials
Drawing and writing materials

Age group
10–14 years

Group size
Individual

Subject
Science

Place
Indoor or outdoor

Time
20 minutes

When
Before or after zoo visit

3 Wild Facts

Given below is the list of some animals and plants prepared with the help of some national institutions such as Botanical Survey of India, Zoological Survey of India, etc. for different states as state symbols. Several states have already taken legislative steps to declare them as state symbols.

State/U.T.	Mammal	Bird	Tree
Andaman & Nicobar Islands	Crabeating Macaque	Megapode	Padauk
Andhra Pradesh	Fourhorned Antelope	Grey Pelican	Red sanders
Arunachal Pradesh	Takin	Peacock Pheasant	Hollong
Assam	Onehorned Rhinoceros	White winged Wood Duck	Bamboo
Bihar	Sloth Bear	Nakta (comb duck)	Mahua
Delhi	Hanuman Langur	Grey Partridge	Arjun
Gujarat	Asiatic Lion	Flamingo	Neem
Goa	Mouse Deer	Brown headed Seagull	Hibiscus
Haryana	Nilgai	Black Partridge	Babul
Himachal Pradesh	Musk Deer	Monal Pheasant	Deodar
J & K	Kashmir Stag	Western Tragopan	Horse chestnut
Karnataka	Slender Loris	Great Pied Hornbill	Sandalwood
Kerala	Liontailed Macaque	Large Racket tailed Drongo	Rosewood
Madhya Pradesh	Barasingha	Paradise Flycatcher	Banyan
Maharashtra	Gaur	Grey Jungle Fowl	Teak
Manipur	Thamin	Hume's Barbacked Pheasant	Toon
Meghalaya	Binturong	Hill Myna	Wild orange
Mizoram	Golden Cat	Blyth's Tragopan	*Michelia montana*
Nagaland	Clouded Leopard	Imperial Pigeon	Areca
Orissa	Sambar	Blue Jay	Tendu
Punjab	Blackbuck	Hoopoe	Shisham
Rajasthan	Gazelle	Great Indian Bustard	Khejri
Sikkim	Red Panda	Blood Pheasant	Rhododendron
Tamil Nadu	Nilgiri Tahr	Spoonbill	Tamarind
Tripura	Leaf Monkey	Fairy Bluebird	Agar
Uttar Pradesh	Leopard	Sarus Crane	Sal
West Bengal	Indian Elephant	Barn Owl	*Bischofia javanica*

Source: P.D. Sharma, *Environmental Biology*, Rastogi and Company, 1994.

Wildlife: Symbols of a Nation 3

Objectives

To make students aware of how wildlife has been used in national symbols, flags, coins and stamps, and identify wildlife as used in state symbols.

Activity

People around the world have used images of wildlife (animals and plants) for their national symbols, including flags, coins, postage stamps and currency. These are not only very attractive, but they also help to communicate some special messages. For examples, some countries issue stamps with pictures of their endangered or threatened species. Such stamps may also be issued to commemorate a special occasion or event. In India also, several coins and currency notes have images of wildlife.

Tell the students that there are animals which have been given the honour of being State animal, and State bird. Some States also have selected their representative State tree. The list of the states and respective state bird/animal can be put up in the classroom. Ask each student or a small group of students to select one state each.

Let the students discuss and find out the following:

- when was this animal, bird and tree declared the state animal, bird or tree.
- characteristics of the state animal, state bird, state tree.
- whether these species are abundant, threatened or endangered.
- what values do they represent that led to their use as state animal or state bird.

Ask the student or the group to make a logo depicting their animal/bird/tree and use it in a flag or banner for the State.

Extension/Variation

Ask each student to bring a coin, currency note or stamp which has used the image of an animal, bird, tree or flower. These could be Indian or foreign. Let the students first put up a display of the materials and explain to the class about their collection—which are the animals/plants depicted and why they think they have been used. Discuss the reasons and advantages of this kind of use. Students may also design a stamp of their favourite Indian animal or bird keeping the basics of stamp design in view.

Material
Writing materials

Age group
11–14 years

Group size
Individual, small groups

Subject
Geography, Social Studies, History, Art

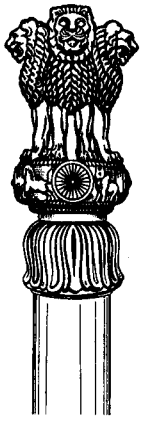
Place
Indoor

Time
30–45 minutes

When
Before or after the zoo visit

The national emblem of India, which was adopted by the Government of India on 26 January 1950, is adapted from the Sarnath Lion capital of Ashoka, popularly known as the Ashoka Pillar. This stone pillar has four lions standing back to back, mounted on a frieze with sculptures of an elephant, a galloping horse, a bull and a lion.

The tiger and peacock have been declared as national animal and bird respectively. Lotus and pipal have been considered for national flower and tree respectively.



Ashoka pillar

4 Wild Facts

Spider

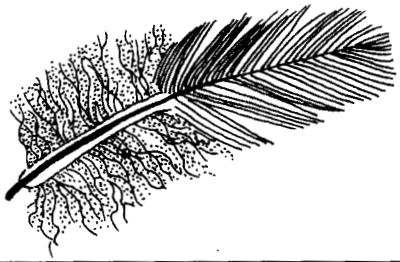
The term wildlife has come to be associated with large fierce animals that live in dense jungles or other such places. Or it is associated with creatures which are dangerous, or a threat to human beings. In fact, wildlife includes all flora and fauna species native to an area which are not domesticated. In other words, all the plants, animals, birds, reptiles and insects species that are not tamed by humans, but living with and around us — often unnoticed by us, e.g., ants, spiders, small organisms and many more are also wildlife. What may be surprising is that wildlife includes even the smallest organisms that can be seen only through a microscope. People and wildlife share environments, homes, work places, gardens etc.

This activity will enable the students to understand that wildlife can be found in some form or another in all parts of our planet — in the deserts and jungles; snow fields and oceans, and even our own homes, buildings and gardens.

Wildlife Detective

As you walk around look for these signs

Signs	Yes/No	Place(wall, tree trunk, soil, etc.)	Who made these?
Cobwebs			
Nests			
Droppings			
Feathers			
Footprints/Tracks			
Burrows			
Sounds			
Any other signs			



Name :

Date :

Place :

Wildlife Detective! 4

Objective

To help students understand that 'wildlife' can be found everywhere, and that humans and wildlife share environments.

Activity

Prepare a worksheet with simple questions (based on the sample sheet on page 52). Make enough copies for all the students and give each student a copy. Alternatively, ask each student to copy out the clues in their notebook.

On the way back from the zoo, stop at a garden, park, field, pondside or beach. If this is not possible, take the students to such a place nearby within a day or two of the visit. Explain to the students that they are wildlife detectives now and they should go around the given area and note down their observations. Instruct students that they should not put their hands into holes and burrows. They should not disturb any nests, webs, etc.

After 15 minutes fixed for the search, let the students reconvene and discuss their findings. This could be done by reading out each clue, one at a time, and asking how many students have observations on that. Discuss the observations in the other columns also (i.e. place, who made these etc). This should help lead to a discussion about the fact that insects, birds, lizards etc. are wildlife too. They share the environment with us. This part of the activity may be done after the visit, on the site, or back in the classroom.

Extensions/Variation

The questions on the worksheet could be designed keeping in view the area in which you will be conducting the activity— for example, around a pond, or in a park or garden.

The activity could also be conducted during the visit to the zoo. This will make students aware that 'wildlife' is not only that which is confined to the enclosures. There is quite a variety of wildlife outside enclosures also.

Evaluation

1) What is wildlife?
2) Give examples of wildlife in a garden.

Based on Wildlife is Everywhere, *project Wild.*

Materials
Writing materials

Age group
11–14 years

Group size
Individual

Subject
Science

Place
Outdoors

Time
40 minutes

When
During or after the zoo visit

Pug mark

5 Wild Facts

There are millions of species of animals and plants. If living things are not classified, it would be almost impossible to study them, understand them or conserve them.

Animals and plants are classified into units called taxa based on factors common to each. Biological classification is the arrangement of living organisms into groups of similar species.

A system of classification not only shows how organisms are related to one another, but it also conveys much information about the animals themselves. For example, when a biologist is told that 'Y' is a mammal, she immediately knows that 'Y' has hair, nurses its young, and several other characteristics similar to all mammals.

Biological classification has 2 functions. The first is to recognize and describe as completely as possible the basic taxonomic units or species. The second is to devise a way of grouping these units on the basis of their resemblances and relationships.

Species is the defining unit of class. Closely related species belong to the same genus, related genera belong to a family, related families to an order and so on through classes, phyla and finally the kingdom. There are fewer divisions at each level, so while there are millions of species, there are only five kingdoms.

A taxonomic key is a device by which each type in a group of types may be identified. For making such a key we have to identify the distinguishing features of each member of the group. Next we have to ask questions about them in such a way that only one of two answers like "yes" or "no" is possible. This game helps students construct taxonomic keys and identify animals.

Classifying a tiger

Taxa from highest to lowest classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	*Panthera*
Species	*tigris*

Who Am I? 5

Objectives

To help students in systematic identification of different animals—mammals, birds, reptiles, and gain an insight into the characteristics of a particular animal.

Activity

Ask the students to stand or sit in a circle. Ask one student to volunteer. A name card is fixed on the back of that student. The card may have the name of a mammal, bird or reptile. The volunteer is not told what label he/she bears.

Now, ask him/her to go around the circle and show the name label fixed on his/her back to all the other students. The volunteer student should then ask questions which would help him/her find out his/her identity. The number of questions should be limited by the group (say 10 questions). Explain that the questions must be such as can be answered in 'yes' or 'no'. No other answers are allowed. Thus the volunteer should be very careful in the choice of questions. He/she should focus the questions by framing them logically, e.g. based on classification of animals and plants. For examples, he cannot ask, 'Am I a snake or a crocodile'. She can however ask, "Am I a reptile?", The students should be encouraged to ask questions based on form, habitat, food habits, locomotion, etc. of the animal, rather than making random guesses.

If the student does not find the answer by the eighth question, others can give a clue to make it easier. Discuss as to how students arrived at the answers. Did they use any classification principles? If so, which?

Extension/Variation

This game can be played by making name cards of various animals (including birds and reptiles) even apart from those seen at the zoo. You could also play using names of only mammals, birds, or reptiles. It could be also played with names of trees. You could vary the number of questions permitted, or the time limit for answering, based on the level of the group.

Materials
Name cards for different mammals, birds, reptiles seen at the zoo and U-pins or safety pins.

Age Group
11–14 years

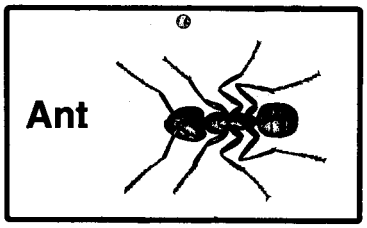
Group Size
Whole class

Subject
Science

Place
Outdoors, Indoors

Time
30 minutes

When
After the zoo visit

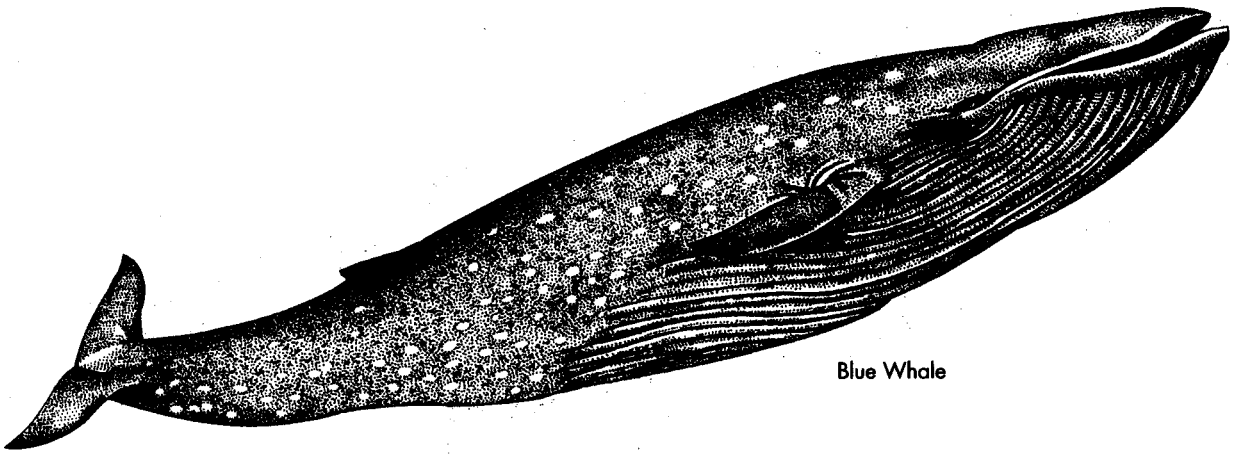


6 Wild Facts

Animals come in all sizes and shapes. The largest living animal in the world is the Blue Whale. It may grow more than 30 m in length and weigh more than 135 tonnes. Although huge in size, these whales feed on tiny shrimp-like sea animals called krill. Elephants are the largest living land animals. They have large, thick legs that support their enormous weight. They spend hours in eating. Elephants eat about 350 kg of food every day—that is more than six per cent of their body weight. A shrew weighing about 2 gm eats about 6 gram of food every day—that is three times its body weight.

Sample list of weights of animals

Animal	**Weight (approx.)**
Shrew	2 gm
House Mouse	5–15 gm
Leopard	60 kg
Chital	80 kg
Sloth Bear	140 kg
Ostrich	150 kg
Barasingha	170 kg
Tiger	200 kg
Sambar	250 kg
Crocodile	500 kg
Gaur	800 kg
Elephant	5000 kg
Blue Whale	135000 kg



Blue Whale

Heavy Weight Champions 6

Objective

To help students appreciate the weights of different animals in relation to human beings.

Activity

Get all the students to tell their own weights. If some of them do not know their weights, ask them to find someone whose weight is approximately the same as theirs and use that. The students should write their weight on a small card and pin it on, so that the other students can see it.

Divide the group into two teams. Each team can have 20–25 students. Ask the teams to stand at one end of the playing area. Mark the other end as the target.

Ask students to guess the weight of a large animal, for example, a tiger. Then tell them the correct weight i.e. 200 kg (see sample list of weights).

The students in each team should group up together in such a way that the total of their weights adds up to the weight of that animal (e.g. 2 students weighing 30 kg each and 3 students weighing 35 kg each and one student weighing 40 kg). The 6 students in that group should form a closed chain holding hands and run to the target. The other team will also have to get together a similar combination of students.

The team which reaches the target first, wins. Play different rounds with different animals. The group can be asked to make the sound of that animals while running.

Extension/Variation

The students in one team may not be able to add up to the weight of some of the animals such as Blue Whale, but call these out nevertheless, to amaze and confuse them!

You could also call out names of some light-weight animals. Ask students to calculate how many of the animals (e.g. shrew) would add up to the weight of the heaviest student and the lightest student.

Evaluation

Discuss with the students:

What are the advantages of being small/large?
Which was the largest/smallest animal they saw at the zoo?

Materials
Table of weights of different animals, small cards for each student and paper clips/pins.

Age group
10–12 years

Group size
40–50 students

Subject
Science, Mathematics, Physical Education

Place
Outdoors

Time
30 minutes

When
During or after the zoo visit

Grey Musk Shrew

7 Wild Facts

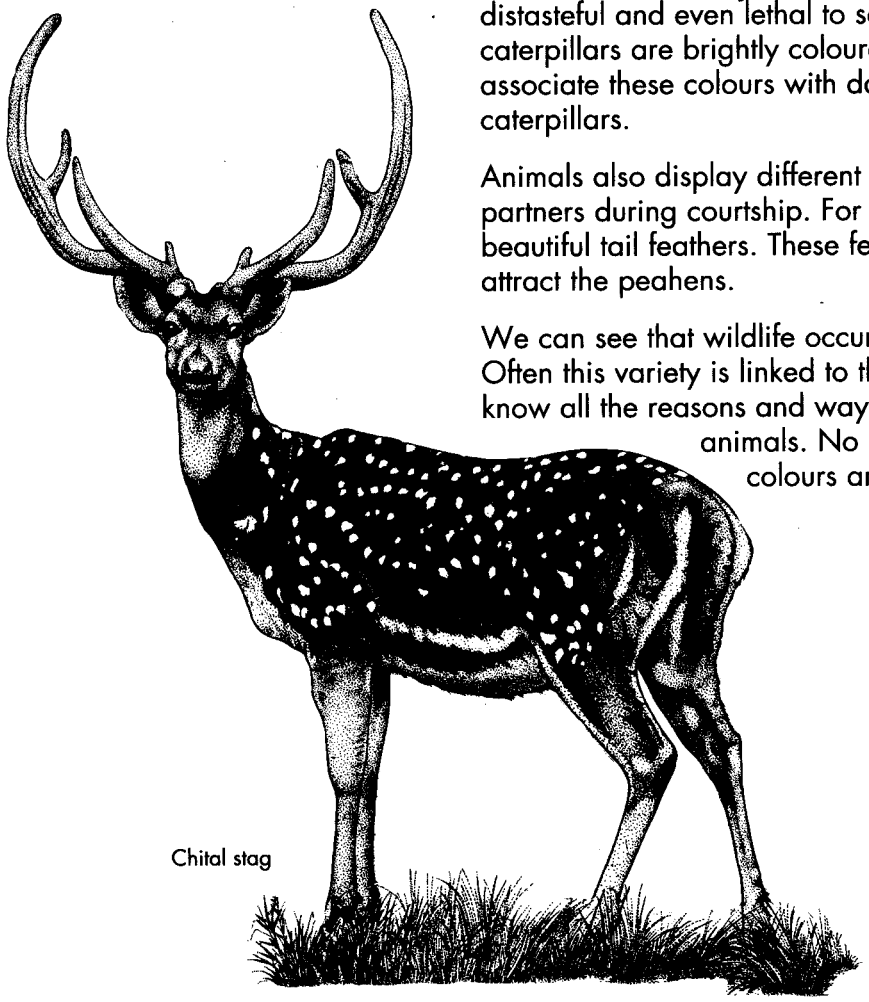
Nature is rich with colour. Mammals, birds, reptiles, insects—all have different colours and patterns. Animal colouring has a wide variety of survival implications. For example, colour is used as a means of protection and a way to attract mates or even as a warning.

Camouflage is the ability to blend with the surroundings. Many animals use this technique to escape predators and also in hunting. For example, a tiger's stripes and its colour help the tiger when hunting in the shadows of the grasses. A tiger sitting in tall grass is extremely difficult to spot. Similarly, prey species also use camouflage. Chital or spotted deer has white spots on the orange-brown coat. This colour offers an excellent camouflage in the filtered light on the jungle floor—an effective device to escape detection by its predators.

Many animals make use of colour to warn off possible predators. The caterpillars of the milkweed butterfly are distasteful and even lethal to some birds predators. These caterpillars are brightly coloured and predators learn to associate these colours with danger and do not eat these caterpillars.

Animals also display different colours to attract potential partners during courtship. For example, the peacock has long, beautiful tail feathers. These feathers are displayed like a fan to attract the peahens.

We can see that wildlife occurs in a wide variety of colours. Often this variety is linked to their very survival. We still do not know all the reasons and ways that colour affects the lives of animals. No matter what the reasons, nature's colours are interesting and inspirational.



Chital stag

Colour Crazy

7

Objective

To help students appreciate the wide variety of colours in wildlife, and that colours have a function.

Activity

Start the discussion by asking students to name and describe some vividly or conspicuously coloured animals. Show students photographs of various such brightly coloured animals. Ask students to pay special attention to this aspect during their visit to the zoo.

Give each student one crayon or colour pencil before the zoo visit. Tell them that they must notice animals at the zoo carefully, and at the end of the visit, draw a creature that they have seen which is predominantly of the colour of their crayon or pencil. They must try and keep as close to natural colours as possible.

After your return display all the drawings by the colours, i.e. all brown animals together, all yellow ones together, etc.

Discuss how nature has a great range of colours for its creatures and possible reasons for these colours. (Adaptation to habitat, camouflage, attracting mates, etc.)

Extension/Variation

Ask students to name wild animals that blend with the following colours: Red, Yellow, Brown, Black, White, Grey.

Discuss also patterns on animals (tigers stripes, chital spots, etc) and how these are useful in helping the animal blend into its surroundings.

Based on Colour Crazy, *project Wild.*

Materials
Drawing papers, drawing/ painting materials; coloured pictures of wild animals.

Age group
8–10 years

Group Size
Any

Subject
Science, Art

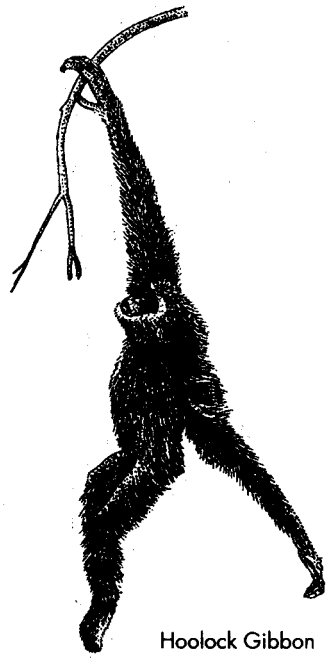
Place
Indoors, Outdoors

Time
30 minutes

When
Before and during the zoo visit

Rhesus Macaque

8 Wild Facts



Hoolock Gibbon

Words that describe locomotion

Bipedal	:	walking on two legs (humans)
Quadruped	:	walking on four legs (most mammals)
Unguligrade	:	walking on tips of toes (hoofed mammals)
Plantigrade	:	walking with sole of feet on ground (humans)
Digitigrade	:	walking on toes (dogs, cats)
Knuckle walking	:	walking on knuckles (chimpanzee, gorilla)

Most mammals walk and run on all four legs, but different mammals use different parts of their feet when they move. Humans walk and run on 'flat feet' (the soles of their feet). So do bears, gibbons and porcupines. Langurs walk with palm and sole pressed to the ground, and the heel raised. Mammals such as hyenas, wolves, dogs and cats walk and run on their toes and the pads of their feet.

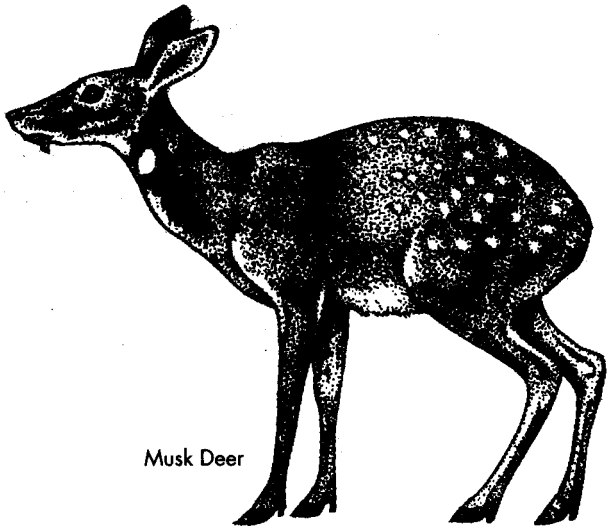
Sheep, goat, deer, oxen and other hoofed mammals walk on hooves (these are modified toenails).

Pangolins walk slowly, with a well-arched back and tail held off the ground. When they walk, the front toes are bent under the soles and whole sole of the hind feet is put to the ground.

Jumpers: Mammals such as kangaroos cover a lot of ground by making long leaps. Their large hind legs (for jumping), long tail (for balance) and small forelimbs (for holding food) are designed to help them to move by leaps and bounds.

Swingers: Mammals that live in trees also depend on strong forelimbs to swing from branches. For example, gibbons have muscular grasping hands and long, strong arms that help them swing from branch to branch.

Fliers: Bats are the only mammals that can fly. Thin skin joins the long finger-like bones in the bat's wing. A bat uses its small hind feet for hanging upside down when it is resting.



Musk Deer

Hop, Leap, Stalk ... 8

Objective

To help students understand how different mammals move and to attempt to imitate them.

Activity

Begin by asking why mammals need to move around (to find food; to take shelter from heat, cold, rain; to escape from predators; to find a mate). Now let the students imitate various mammal movements e.g. kangaroo, rhino, lion, langur, bat, elephant, pangolin, gorilla, chital, bear, cheetah. One student could lead and the others follow the movements of the leader. For example, students should hold their arms close to their chests and jump forward (like a kangaroo) or, to imitate a gibbon, students should raise their hands above their heads, reaching one arm forward at a time, to grab 'branches' as they walk.

Call an even number of players in an open area outside or indoors. Before starting the game, choose a list of mammals that move in distinctive ways. Copy each name on two separate slips of paper and make two sets of the names. Put each set of slips of paper into a separate bag (both bags should contain an identical set of slips).

Divide the students into two equal teams. Explain that each person on one team has a partner on the opposite team. The partners should try to find each other.

Give each team one bag. Let each person pick one slip from the bag. Students should not say which mammal they have picked. Now let the teams form two lines facing each other. (The teams should be about 10–12 m apart).

When you say 'go', all the students should start moving like the mammal on his/her slip and head toward the other team. When the partners find each other, they should sit down and wait till everyone else has paired up. (Students may also mimic the sounds that their mammals make.) A few rounds could be played so that students get a chance to imitate different mammals.

Extension/Variation

This activity can be done at the zoo itself after the students have been around the enclosures. While doing the round, draw the attention of the students to any animals that are moving around and ask them to observe their movements.

Materials
Slips of paper, pen/pencil, U-clips

Age Group
10–12 years

Group Size
Not more than 20

Subject
Science, Physical Education

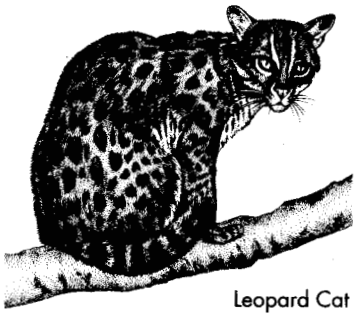
Time
30 minutes

Place
Outdoors, Indoors

When
During or after zoo visit

Kangaroo

9 Wild Facts



Leopard Cat

What is a Cat?

Cats are a group of mammals called *felids* or felines. Most big cats live and hunt alone, are very secretive, and live in wild places, as far from people as they can get. They hunt by sneaking up on their prey, or stalking, and pouncing at the last moment. But two cats—the lion and cheetah—are a bit different from others. Lions usually live and hunt in groups called prides. It is easy to tell the lion, with its furry mane, from the lioness. Cheetahs are different too. Rather than stalking their prey and pouncing on it, they run it down with incredible speed.

Most cats live in the world of shadows. When sunlight hits the leaves of trees, bushes and grasses, it creates crazy patterns of light and dark patches everywhere. The spots or stripes on a cat's coat often match those patterns. Thus the cat blends into its background—making it easier to stay hidden from enemies or to sneak up on prey. The colouring and patterns of cats vary depending on the environment in which they live. Lions, caracals and a few other cats do without spots. They usually hunt in open country where a spotted coat probably wouldn't be helpful.

Tiger: It has vertical black stripes over its yellow-orange body. Its stripes blend with the shades of the grass. The marking helps the tiger to stalk prey unnoticed. Not all tigers are orange and black. A very rare type of tiger is white with black stripes and blue eyes! White tigers have a hard time surviving in the wild. One reason could be that their prey can see them easily and escape. White tigers are found in most large zoos.

Leopard: Its coat is marked with small close-set black rosettes. Some leopards seem to have no spots—they are the so-called black panthers. But these cats are really just regular leopards with dark fur. The normal pattern of spots can be seen in black panthers if observed minutely.

Lion: It lives in patches of thorn forests with interspersed grasslands. Its coat is brown with no spots or patterns on it. This uniformly coloured skin helps the lion to blend with the background in the open grasslands. In India, the lion in the wild is confined to the Gir forests of Gujarat.

Snow Leopard: The colour of its coat ranges from soft grey to pure white on the underside, with larger rosettes.

Clouded Leopard: Colour of the body varies from grey to earthy brown, with dark blotches lined with black. It inhabits dense evergreen forests where it hunts by night.

Fishing Cat: The body markings consist of a series of elongated spots arranged in more or less longitudinal rows.

Caracal: The colouring is uniform reddish grey.

Cheetah: Cheetah has solid close-set black spots. The cheetah is now extinct in India. The last record of the cheetah in India is of three males shot in Madhya Pradesh in 1948.

Patterns on Cats

9

Objective

To draw students' attention to the fact that different members of the cat family have different kinds of coats, and to understand how this helps the cats in camouflage.

Activity

When you reach the cats section of the zoo, talk to the students about different cats, their behaviour, their food, how they find their food and how their body parts are adapted to hunting. Tell them why each cat is differently coloured and patterned and how these designs on their body help them in blending well with the background.

When you reach the tiger enclosure, talk to them about the stripes, why they are black and vertical and not horizontal. As and when you move to the other cat enclosures, explain to them that cats are coloured according to their habitats. Ask them to observe the cats' coats very carefully. Let the students write down the colour and pattern of each cat they observe. For example:

Tiger – orange background, black vertical stripes
Lion – sandy brown with no patterns
White tiger – white background and black stripes
Leopard – black rosettes on its body

After you finish, it is time for the activity. You can either do it in the zoo (if there is enough space and time, or do it when you get back your classroom).

Let the students recollect the colours and patterns of the cats seen at the zoo. The students have to draw patterns and add colours to the outline drawings.

Extension/Variation

A similar activity can also be conducted in the reptiles' section. Ask the students to observe the patterns on the snakes, crocodiles, tortoises, etc. They can also sketch and colour these patterns.

Evaluation

Name any two cats with black spots
Name two cats which are uniformly coloured.

Materials
Colouring materials (crayons, pencils), drawing sheets

Age group
8–10 years

Group size
Individual

Subject
Science, Arts

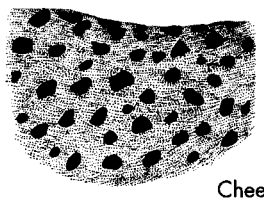
Time
30 minutes

Place
Outdoors, Indoors

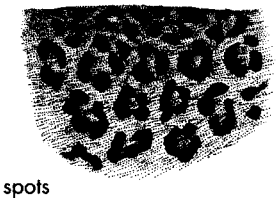
When
During or after the zoo visit

Changing Spots

You can distinguish between a leopard and a cheetah by their spots. A cheetah has solid close-set black spots whereas a leopard has close-set rosettes.



Cheetah spots



Leopard spots

10 Wild Facts

Slow Loris

Primates of India

Macaques
Rhesus Macaque
Assamese Macaque
Pigtailed Macaque
Bonnet Macaque
Crabeating Macaque
Stumptailed Macaque
Liontailed Macaque

Langurs
Hanuman Langur
Golden Langur
Nilgiri Langur
Phyre's Leaf Monkey
Capped Langur

Apes
Hoolock Gibbon

Lemurs
Slender Loris
Slow Loris

Primates are a group which includes apes, monkeys, lemurs and humans. Primates are the highest order of all animals.

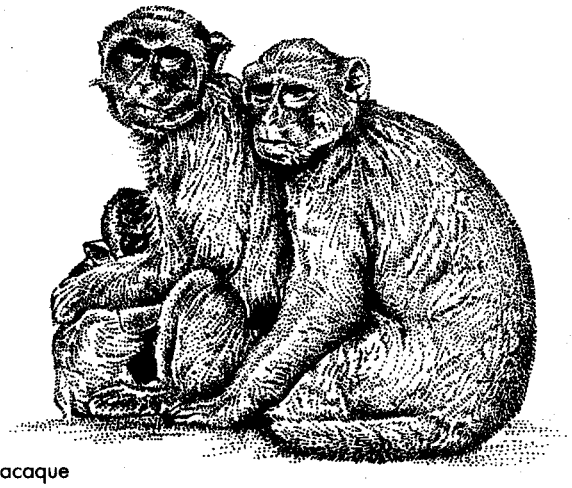
The hands and feet of primates are designed to serve the purpose of grasping organs. A typical primate characteristic is the ability to grasp objects with fingers and/or toes. This ability is especially useful because most primates spend a lot of time in trees and need to hold on to branches and vines. Another primate speciality is an opposable thumb, that is, a thumb that can move in such a way that its tip touches the tips of the fingers.

The hands of apes, monkeys and lemurs are constructed on the same plan as our own. The thumb is opposable to the other fingers. Such a hand can pick up and hold objects. But primarily, hands of non-humans primates remain organs of locomotion.

A gibbon's thumb is set far down the side of its slender hand, and parallel with the other fingers. Yet the long narrow palm of the gibbon and its long flexible fingers, when hooked over a branch, provides light and ideal suspension for its body. The thumbless hand on some monkeys expresses a perfect adaptation to the need for rapid movement through the trees.

Many apes and monkeys have poorly developed thumbs and some monkeys have no thumbs at all, or thumbs so small that they are almost useless. However, gorillas have opposable thumbs (big toes) on their feet as well as hands.

Most zoos in India have at least one species of primates. Rhesus and Bonnet Macaques are probably the most likely to be found.



Bonnet Macaque

No Thumbs! 10

Objective

To help students understand about the form and function of hands of primates.

Activity

Begin by getting all the students to touch one of their thumbs to the tip of each finger on the same hand. Explain that this ability, or the presence of an opposable thumb, helps people and other primates to perform a lot of tasks that would otherwise be impossible.

Ask the students to imagine what life would be like if they did not have a thumb. Let the students then experience problems they are likely face it they became thumbless .

Using a handkerchief, let each student tie his/her thumb to their palm. Students may have to take help of their friends in doing this now. Ask them to perform the following tasks:

- Open a notebook
- Hold a pen/pencial
- Write a sentence
- Rub it using an eraser
- Catch a ball or any other object
- Untie the handkerchief on one of their friends' hands

Ask the students which of the tasks were easy for them to perform and which was the most difficult one. Let the students do all the jobs again with the thumb free.

You could also divide the students into two teams and have a 'thumbless' relay race, passing an object down the line and seeing which team succeeds in doing so first.

At the zoo ask students to observe the different primates and note the structure of their hands and feet, and the presence or absence of the opposable thumb.

Materials
Handkerchieves

Age group
8–12 years

Group size
Whole class

Subject
Science

Time
20 minutes

Place
Outdoors, Indoors

When
After the zoo visit

Hoolock Gibbon

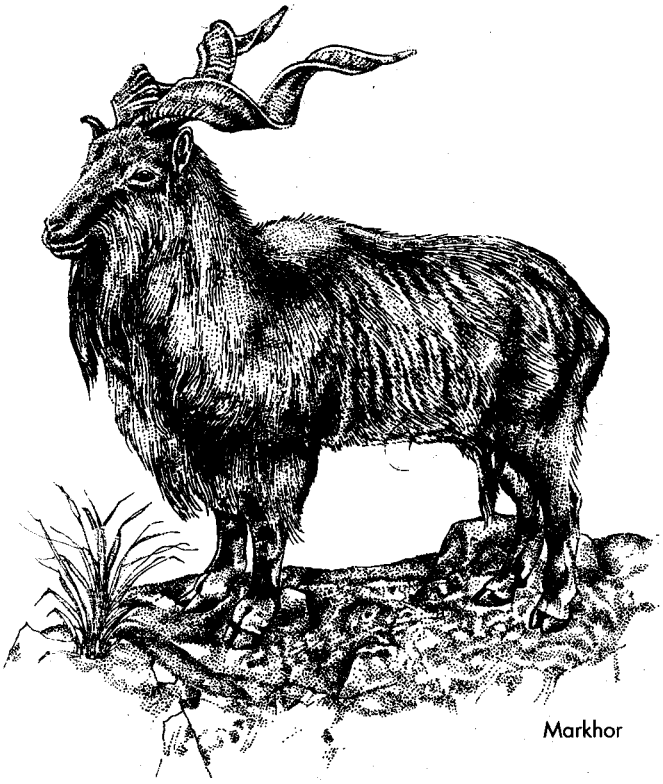
11 Wild Facts

Musk Deer

A horn is a slow-growing permanent bone, covered by a thin layer of hard material. Horns are hollow, usually unbranched and permanent structures, found only in the ox or the *bovidae* family. Horns may be found on both sexes and are used for defense as well as by males in mating fights. Animals having horns include sheep, bison, markhor, impala, ox, and buffalo.

Antlers are outgrowths on the heads of the members of the deer or *cervidae* family. They are branched and are solid. They are not permanent structures—they grow and are shed every year. Unlike horns, antlers are often elaborately branched. Only males of the species have antlers. Antlers are often used for defense and in battles between rival males during the mating season. Examples of animals that have antlers include sambar, chital, barasingha, barking deer.

Velvet is a layer of skin and hair that covers the antlers of deer and some other mammals as the antlers are growing. During the rutting season, a deer's velvet dries up and the animal scrapes or rubs it off.



Markhor

Did You Know?

- A giraffe's horns are covered with skin and hair, not hard material.
- A rhinoceros horn isn't bone at all, it is a densely-packed mass of hardened hair fibres, and is therefore not considered a true horn.
- Musk Deer do not have horns. Instead they have tusks.
- The longest horns are found on Water Buffalo of India
- Moose Deer has an unusual type of antler. These are broad and flat in the upper part and take a palm shape which branches out into finger-like points.
- The largest antlers are found on the Moose Deer of North America.

Head Dress

11

Objective

To help students understand the differences between horns and antlers, and some of the ways mammals use their horns and antlers.

Activity

Before the visit to the zoo, talk to students about horns and antlers. Show them pictures of animals having antlers and horns. Discuss the differences.

During the visit, ask the students to observe all the animals that have bony structures on their heads. Students should write the name of each of these animals and if possible, draw the structures in their notebook. Students should make notes on horns/antlers on each animal: whether they are small or large, if branched etc. They should also label each drawing as 'horn' or 'antler'.

Students should observe, sketch and note down the types of horns/antlers of different deer and antelope (chital, sambar, barasingha) as well as those of a rhinoceros, a wild buffalo, goats, etc.

After the visit, ask the students to bring pictures of animals having horns and antlers. Put all the pictures together in a box. Put up a large drawing sheet in front of the classroom. Make two columns on the sheet, with the label 'Horns' on one column and 'Antlers' on the other. Now call a student to pick up the picture of any one animal, show it to the class, and ask the other students to identify whether the animal bears horns or antlers. Help the student to find out and paste the picture in the correct column. Each student should get a chance. The drawing sheet will become a collage of animals.

Materials
Writing materials (pen/ pencil, notebook), large drawing sheet, gum, pictures of horned animals.

Age group
10–12 years

Group size
Entire class

Subject
Science

Time
30 minutes

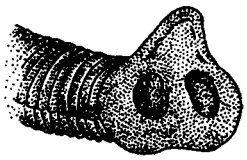
Place
Indoors

When
Before, during and after the zoo visit

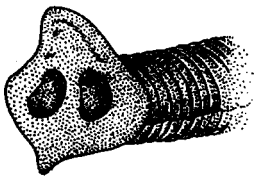
12 Wild Facts

Trunk Facts

- The trunk of the elephant has no bones.
- The trunk of the elephant consists of approximately 300 pounds of hair, skin, connective tissue, fat, blood vessels and a network of muscles and nerves.
- Asian elephants can draw nine litres of water at a time into their trunks and release it into their mouths.



Trunk tip of Asian elephant



Trunk tip of African elephant

Just as an elephant's tusks are long teeth, its trunk is actually a long lip. The trunk is the conjoined upper lip and nose, with nostrils running like two parallel hoses from the trunk's base down to its tip.

An elephant's trunk is a highly versatile and sensitive structure. It can smell and touch. The trunk can be used to reach objects high above the head, even objects an elephant cannot see. Its stretching and flexing capacities give elephants easy access to plant species beyond the reach of many other animals that share its habitats. The trunk allows the elephant to eat from the ground as well as from tall trees.

Elephants can suck water up into the trunk and squirt it out, over their own body, or at others. They also use it to sprinkle dust and grass on their body, presumably to protect against insect bites. They also trumpet through the trunk.

The trunk tip is especially very sensitive, being rich in nerves and equipped with a tactile bristle. It can be put to use as a "hand" and in most delicate operations can function with the dexterity of fingers. It can pick up even a straw and collect coins, and also uproot large trees.

Elephant engage themselves in a "trunk shake". This can be compared to a human hand shake and may be associated with similar functions such as assurance and greeting. It may also be a way for elephants to test each other's strength.

There are two surviving species of elephants in the world. They are the Asian elephant and the African elephant. There are several differences between the two, even in their trunks.The trunk tip alone can reveal the identity of an elephant of an elephant as Asian or African.

- The Asian elephant has only one "finger" projecting from the upper side of the tip, and the underside is thick and rather stumpy. When it picks up objects, the Asian elephant most often curls the tip of its trunk around and grasps the items. The African Elephant has two fingers on its trunk tip and picks up items by the pinch method—similar to how a human plucks and holds an object between thumb and index fingers.
- The trunk of the African elephant has many folds or rings of skin, while the trunk of the Asian is smoother, with fewer rings.

Trunk Calls

12

Objective

To observe elephants and understand the different uses of an elephant's trunk.

Activity

While at the zoo, tell the students to observe elephants and note down what they are doing, for example, eating, drinking, spraying dust/water over themselves, standing, sitting etc. Tell them to observe especially the trunk of the elephant, its structure, and how it is being used by the elephant. In case there are African as well as Asian elephants in the zoo, tell students to observe the difference in the trunks of the two, and discuss these. Later let students use one hand as a 'pretend trunk' and ask them to act out some of the actions listed below:

Pretend you are an elephant and use your 'trunk' for the following:

- Take a shower
- Pick fruit from a tree
- Say hello to other elephants
- Spray dust over yourself
- Carry logs
- Warn other elephants
- Eat
- Throw things
- Breathe while swimming

You could also make slips of paper, each with a phrase describing an action of an elephant using its trunk. Use the sample list of actions given, and you could add some more. Let one student at a time pick a slip. The student has to mime the activity. Let the other students guess what it is meant to depict. With each right guess put up the phrase on the blackboard. In case the action cannot be guessed, you could tell what it was, and add it to the list. Once all the actions are listed, discuss the great many and versatile uses that an elephant puts its trunk to.

Materials
Writing materials (pen/pencil, notebook)

Age group
10–12 years

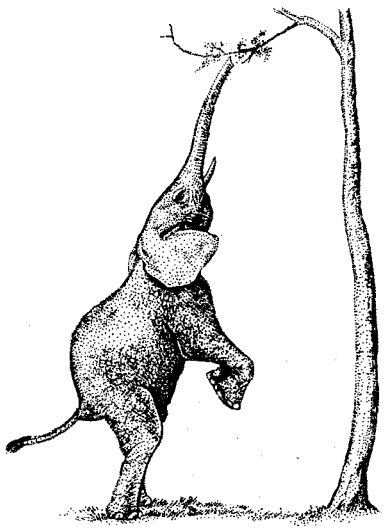
Group size
Whole class

Subject
Science

Time
30 minutes

Place
Outdoors

When
During and after zoo visit



13 Wild Facts

Clues for Bird Feet

1. I use my feet as paddles when I swim. My toes are webbed and they are connected to each other.

   – Pelican
   – Duck
   – Goose

2. My feet have two toes in the front and two toes at the back. These help me in climbing up and down tree trunks.

   – Parakeet
   – Woodpecker

3. All my toes face forward, so I can run fast.
   – Bustard
   – Ostrich

4. My feet have three toes in the front and one toe at the back. This helps one to grip my perch tightly.

   – Myna
   – Sparrow
   – Dove

5. I have long curved claws that help me to dig into the prey and also carry it as I fly.

   – Kite
   – Eagle
   – Hawk
   – Owl

Birds' feet, and especially their toes, come in a variety of shapes and sizes—just as their beaks do. And each foot is well suited to how and where a bird lives. What most people think of as bird's feet are really just its toes. The actual foot extends to the backward bend in its leg. The bend is the bird's ankle, not its knee.

Most birds have four toes on each foot and all birds have a claw at the tip of each toe, but different birds have different-sized toes and claws, and a different arrangement of toes, with some facing forward and others facing backward. Out of the four toes, the majority of birds have three toes facing forward, and one facing backward. Some like the Common House Swift have all four toes facing forward.

Climbers: Woodpeckers have two toes in front and two toes at the back for climbing up and down tree trunks. Parakeets also have the same toe arrangement.

Perchers: Sparrows, mynas, doves and many other birds have three toes that face forward and a long hind toe that helps them grip their perches tightly.

Graspers: Hawks, owls, and other birds of prey (e.g. Tawny Eagle) have long curved claws, called talons, that dig into their prey and help them hold onto it in flight.

Lily Trotters: Jacanas and moorhens have feet with very long toes which help them walk with ease on the floating vegetation.

Runners: Bustards, coursers, and bustard quails have three toes instead of four and all their toes point forward for fast running.

Scratchers: Pheasants, junglefowl, partridges have rake-like toes for scratching the soil.

Swimmers: Ducks, cormorants and pelicans have webbed feet, while coots and grebes have lobed feet. They use their feet as paddles.

Feet are Neat

13

Objective

To make students aware of several types of bird feet and understand how each helps a bird survive in its habitat.

Activity

Since different types of birds use their feet in different ways, bird feet are found in a variety of different shapes and sizes.

One good way for children to understand how birds are adapted to live in their habitat is for them to take a look at bird feet.

Ask your students to think of some of the ways birds use their feet. (They use them for walking, perching, swimming, running, climbing and grabbing). Then talk about some of the different kinds of feet different birds have. Some examples are given on page 70.

On large sheets of appear, sketch out the shapes of bird feet as given on page 70 . You should have one kind of 'feet sketch'on one sheet. Each one should be labelled: e.g. 'Climber', 'Swimmer', etc.

Now make slips of paper with the clues given on page 70. You can make 4-5 slips with the same clue. Behind each slip write the name of one bird that fits into that particular feet category. (e.g. for the clue, "I use my feet as paddles when I swim", you could make three slips, but with one name each—duck, swan, goose, written behind each one). If you could also put the pictures of the different birds with the name it would be even better.

Put up the large sheets in the classroom, or outdoors. Mix the clue slips and put them in one place. Let each student pick up a clue sheet. Then ask each student to read his/her clue slip, and go and paste it on the 'feet sheet' which they think matches their clue. In case the placement is not correct, you could ask other students to suggest where it could fit.

At the end of the activity, draw attention to the way the variety of birds have been matched with the variety of feet. Lead the discussion onto the adaption and features which help different birds live in different habitats.

Source: Birds, Birds, Birds, CEE's *NatureScope India*

Materials
Large sheets of paper, slips of paper, pictures of birds (optional), pen, pencil, pins, gum

Age group
12–14 years

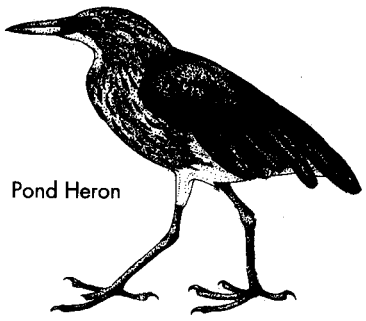
Group size
Whole class

Subject
Science and Art

Time
30 minutes

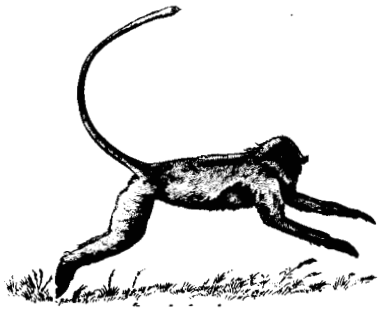
Place
Indoors, Outdoors

When
During or after the zoo visit



Pond Heron

14 Wild Facts



Hanuman Langur

Animals, birds or plants cannot live in isolation. In the wild, they need each other. Animals interact with each other for a number of reasons. Some share the same habitat, some depend on other animals for food. In some relations, only one animal gets the benefit but in others both are benefitted.

In a prey-predator relationship one would believe only the predator to be the beneficiary. For example, chitals and tigers. But tigers are important for the survival of the chital. If tigers weren't around, the population of chital would increase and within few years, there would not be enough fodder for the herbivores and they would die.

In some relationships, both the animals are benefitted and it is a 'give and take' relationship. For example, chital and langur. Chital are versatile feeders, as are the langurs. Chital feed under a tree and langurs on the tree. Langurs are quite selective in their eating . They pluck a fruit, take a bite or two and throw it away, then pluck another one. As they swing and jump from one branch to another, their movements may cause leaves, flowers and fruits to drop down. Chital are quite aware of this habit of the langur, and benefit from it by foraging under the tree. The relationship is not limited to this. Chital also benefit from langur alarm calls as the latter, from their tree-top vantage points, are able to spot a predator much sooner.

When trees are in flower, they attracts a number of birds, insects and insect-eating birds. The tree benefits from these visitors. For example, many insects come to feed on the pollen or the nectar of the flowers on the Silk Cotton Tree. The birds feed on both the nectar and the fruits of the tree and the tree in the process gets pollinated by both. The birds drop the seeds (with their excreta) far away from the original, helping in seed dispersal.

Discuss the difference between animals who have to find their own food in the wild, and animals which are in the zoo. The kind of food chain that exists in Nature is not found in a zoo where animals are fed, rather than having to acquire their own food. Thus they are in an artificial environment where some of the laws of survival in the wild do not affect them.

Linking Up

14

Objective

To help students understand the variety of relationships between different species.

Activity

Choose a set of characters in a food chain. For example: Grass, grasshopper, frog, snake, eagle. Write each name e.g. 'grasshopper', 'frog', etc. on five cards each. You can make the number of cards for each character depending on the size of the group. For example, for a group of 50 players you can have 10 cards each for each of the characters.

Ask the players to stand in a large circle around you. Distribute the cards to the players. Explain that the game will be played as in musical chairs, with the players running in the circle as long as the music is on. When the music stops, you will call out a number. The number you call out should not be greater than the number of characters you have chosen. For example, for the food chain Flower, Moth, Frog, Snake, Eagle, which has five characters, you can call out any number between 1 and 5.

The players have to stop running when the music stops, and gather in groups made up of the same number of individuals as the number you have called out. For example, if you have called out the number three, the players gather in groups of three members each.

Explain that this grouping has to be on the basis of some relationship between the characters on the cards that the students have been given. For example, animals of the same species can group together (three frogs), or animals having a prey-predator relationship can group together (two grasshoppers and one frog or one frog, one snake, one eagle).

After the players form their groups, ask each group to explain the relationship on the basis of which they have grouped. They must make sure that there is a logical reason for their grouping.

After three or four rounds, you can tell the players that they must now group on the basis of predator-prey relationships or the group should have only one animal from each species. For example, two frogs or two snakes are not allowed. This variation will lead to making a food chain.

Materials
Cards with names of animals, U-pins for clipping cards on to clothes, any instrument to make some sound (as in musical chairs)

Age group
11–13 years

Group size
20–50 students

Subject
Science, Physical Education

Time
30 minutes

Place
Outdoors

When
After or before zoo visit.

Example of a food chain

15 Wild Facts

Who Goes Where?

Forest
Tiger, chital, gaur, dhole, langur

Desert
Wild ass, desert cat, gerbil, bustard, chinkara, sand grouse

Mountain
Himalayan tahr, snow leopard, bharal, wild yak, monal pheasant

Ocean
Mudskipper, dolphin, sea turtle, octopus, star fish

Pond
Fish, kingfisher, mud turtle, water snake, pond heron, duck

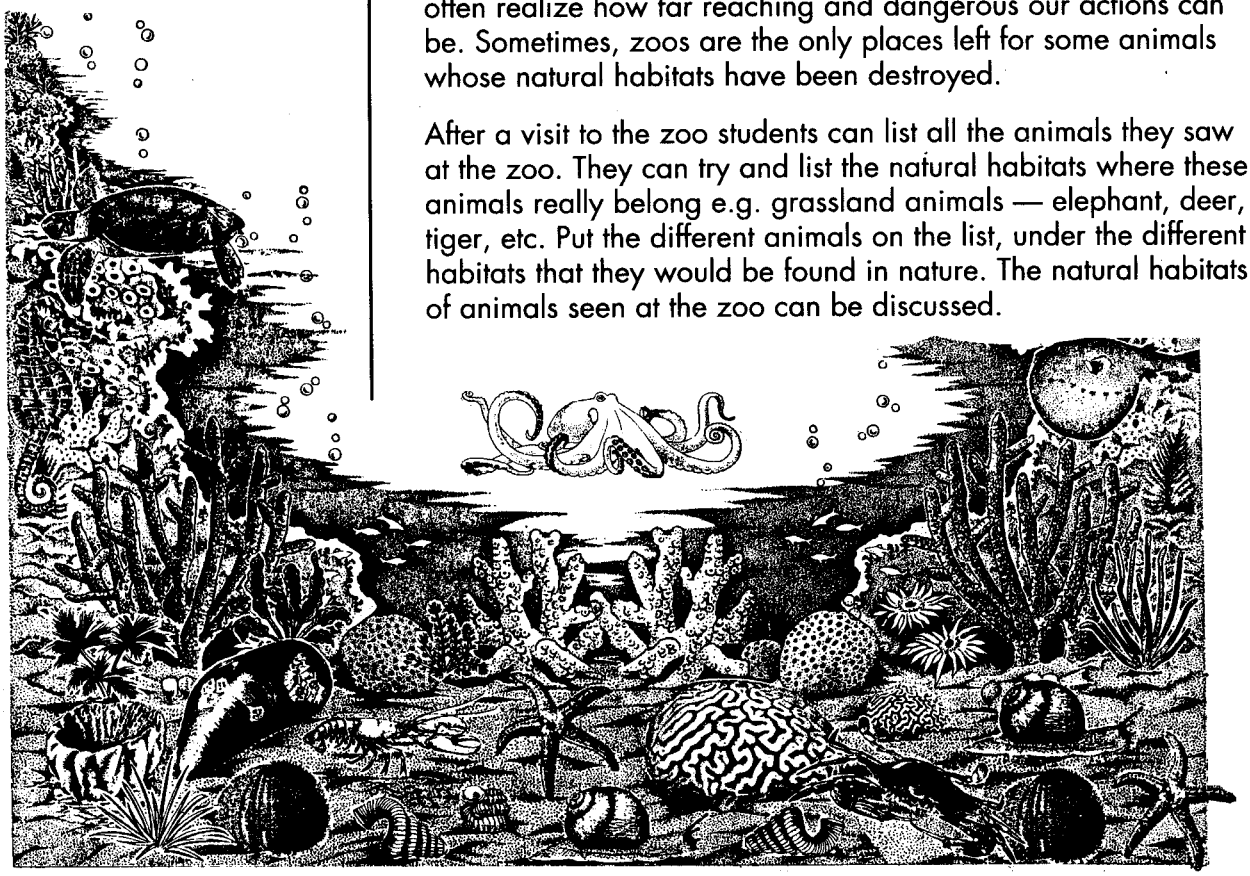
Tree
Langur, dove, garden lizard, owl, parakeet

Human home
Cockroach, lizard, ant, sparrow, pigeon

The type of surroundings in which an organism lives is called its Habitat. In other words, an animal's home is its 'Habitat'. Habitat is a place or site where an organism or population naturally occurs but it is not just a place to live. An animal's habitat includes food, water, shelter, and adequate space. More importantly these components of habitat must be in a suitable arrangement for its inhabitants. Habitats can range from the underside of a leaf to a vast forest.

Today human activities are destroying the habitats of innumerable other living creatures. Some of these links are direct and obvious. For instance, it is easy to understand that when, to build our cities and houses, we clear forests and fields, fill ponds and lakes, dam, rivers and streams—we displace the hundreds of thousands of creatures who have made their homes there. Some of our activities also destroy habitats indirectly. This link may be a little more difficult to visualize. For instance, oil spills and pollution from industries choke coral reefs and poison rivers and lakes; poisoned fumes from our factories and vehicles slowly kill forests. We do not often realize how far reaching and dangerous our actions can be. Sometimes, zoos are the only places left for some animals whose natural habitats have been destroyed.

After a visit to the zoo students can list all the animals they saw at the zoo. They can try and list the natural habitats where these animals really belong e.g. grassland animals — elephant, deer, tiger, etc. Put the different animals on the list, under the different habitats that they would be found in nature. The natural habitats of animals seen at the zoo can be discussed.



Coral reef

Who Goes Where? 15

Objective

To help students understand that animals live in different habitats, depending on their needs.

Activity

Make cards or slips, each with the name of mammal, bird, insect or reptile (see sample list on page 74).

Ask the students to stand in a close circle, facing inwards. At four corners outside the circle, put up signs indicating different habitats—for example, Grassland, Desert, Ocean, City (urban area); or tree, human home, pond, mountain.

The habitat labels can be marked on the ground with chalk, or they can be put on a tree trunk, pillar, etc.

Distribute the name cards to the students at random. Each students gets one card.

Start playing the music. The players should pass the cards around in the circle, i.e. give their card to the student on the right and take the card from the student on the left, for as long as there is music.

When the music stops, each student looks at the card in hand. They should then turn around and run to the habitat corner that they think they belong to.

Once all the students have found their own corners, go to each 'habitat' and discuss why each student thinks he/she belongs there.

During the discussion, ask the following questions:

Are all the animals in their correct habitats?

Why do animals live in a particular habitat?

What does the habitat offer the animal or plant?

What are the interrelationships among the species represented in each habitat?

What happens to each of the species when that particular habitat is destroyed?

Can any of the particular species live in any of the other three habitats?

Have we realized that we share our homes with numerous other living things that have now adapted to life in a human habitation?

Materials
Cards or slips of paper with names of different animals, music-making instrument (a bell/spoon and glass)

Age group
10–13 years

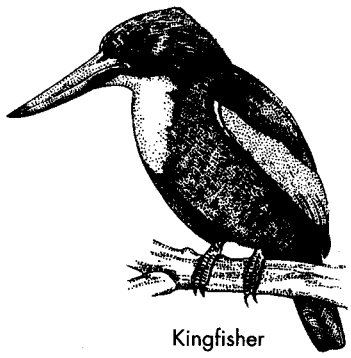
Group size
About 20

Subject
Sciences, Physical Education

Time
30 minutes

Place
Outdoors

When
Before and after zoo visit



Kingfisher

16 Wild Facts

Tiger stalking porcupine

All animals that feed themselves primarily on other animals are called 'predators'; the species they feed on are called 'prey'.

Predators invest time and energy in locating, capturing and consuming food or may take advantage of another individual's success and scavenge on already captured prey. Occasionally, a predator may kill more than it needs at one time and store the unused food in a hiding palce for later use, or simply leave it.

Every prey species needs fuel for survival that is acquired from eating other living organisms. They may feed on smaller prey animals or on vegetation.

The ways in which predators hunt for food and capture and kill prey are diverse and typical of the species. Some rely on speed, others on endurance, or brute strength to capture prey.

Some predators species have unique techniques and specializations. Bats use echolocation to find prey; anteaters trap termites on their sticky tongues; shrikes impale lizards on thorns.

Some predators stalk and chase prey, some sit and wait in ambush, some build traps to capture prey e.g. spider webs. Some predators hunt alone, other in pairs or larger groups (wild dogs, wolves, lions).

Prey species also have a variety of devices and ways (behaviours) by which to avoid becoming prey. These are adaptations to survive.

Prey behaviours include flight, taking fighting position and even 'freezing' on the spot to escape detection or capture by predators. The kind of behaviour exhibited partly depends on how close the predator is when detected by the prey. Each animal has a threshold for threat levels. If a predator is far enough away for the prey to feel safe, the prey may signal to others that a predator is near. If the predator comes closer, the prey may try to run away. If the predator is too close to make running away feasible, the prey may attempt to scurry to a hiding place. If the predator is so close that none of these alternatives is available, the prey may freeze in place. This 'freezing' occurs as a kind of physiological shock in the animal.

You may want to discuss the methods which prey use to escape, which methods are easier, what methods are effective, etc.

Discuss also the need for animals to strike a balance between safety and food.

Prey-Predator 16

Objective

To demonstrate how predator-prey relationships operate in nature and the role of adaptations in predator-prey relationships.

Activity

Divide the players into two groups. One group represents the 'prey', the other group are 'predators'. There should be approximately one predator for every four to six prey animals.

Tell the players that one end of the playing area has food of the prey species and the other end is the shelter for the prey. Mark (with chalk powder or stick) four or five circles (about half a metre in diameter) between the 'shelter' and the 'food' ends of the playing area. These circles represent temporary shelters for the prey.

Place the food tokens at the 'food' end of the playing area. The prey animals have to stand at the 'shelter' end. The predators stand anywhere between the food and shelter ends, except in the temporary shelters.

Each round of the game begins at a whistle or clap. The prey animals have to move from the shelter end to the food end, and collect two food tokens each. After collecting the food tokens, they must return to the shelter. Unless they collect two food tokens they "die" of starvation (that is, they are out of the game in the next round). As the prey animals run from the shelter end to the food end and back with their food tokens, the predators try and catch at least two prey animals each. Otherwise they die. Captured prey are taken to the side by the predator who catches them.

The prey animals have two ways to prevent themselves from being caught: they may 'freeze' i.e. stand still when a predator is about half a metre away from them; or they may stand in the circles which are marked as temporary shelters. If a prey animal freezes, the predator has to look for other prey. The prey can remain still or be in the temporary shelters for as long as it likes, but if it does not have enough food at the end of the activity, it dies. The game can have up to four rounds.

Older students can chose different ecosystems for each round. For example: pond ecosystem in which players can be kingfisher (predator), fishes, frogs (prey); Marine Ecosystem—shark (predator) and small fishes (prey).

Based on Quick Frozen Critters, *project Wild.*

Materials
Chalk, pieces of crumpled waste paper or pebbles to represent food for the prey animals (there should be at least two food tokens per prey animal).

Age group
13–15 years

Group size
Up to 40

Subject
Science, Physical Education

Time
30 minutes

Place
Outdoors (preferably a clear area large enough for players to run).

When
During or after the zoo visit.

17 Wild Facts

People and other animals share some basic needs. Every animal needs a place to live. The environment in which an animal lives is called its habitat. An animal's habitat includes food, water, shelter and space in an arrangement appropriate to the animal's needs. Thus the most fundamental of life's necessities for any animal are food, water, shelter and space in a suitable arrangement. Without these essential components, animals cannot survive. It is not sufficient that there are food, water, shelter and space. In order for animals to survive, all these components of habitat—food, water, shelter and space must not only be available but also properly arranged so that they can fulfill the animal's needs, e.g. if there is too much food but not enough water, this will lead to disturbance. This arrangement is also disturbed, if any of these components of habitat is missing or is affected by any natural or man-made factors. For example floods, drought, fire, tree cutting, disease, predation, pollution, accidents and climatic conditions are among factors which can have an impact on the habitat.

Gaur

Habitats are being destroyed by human actions. Whenever an area of land is taken over for creating agricultural fields, constructing shopping centre, housing societies, office complexes etc. many animals lose their homes, and frequently their sources for food and water. For example, many wetlands have been filled in or drained to make land for farming and construction of buildings. When they are filled in, many kinds of birds, reptiles, amphibians and other life forms including a wide variety of life forms are lost. Sometimes, the animals move to a different place but most often they cannot. As these animals disappear, so too do other animals dependent on these animals as a source of food, in the food chain.

A variety of factors affect the ability of wildlife to successfully reproduce and maintain their population over time. Disease, prey/predator relationships, varying impacts of weather conditions from season to season (flooding, heavy snowing, droughts), accidents, environmental pollution and habitat destruction and degradation are among these factors.

Some natural as well as man-made factors also serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support.

A limiting factor is defined as the influences in the life history of any animal, population of animals, or species, e.g. food, water, shelter, space, disease, predation, climatic conditions etc.,

(Continued on page 80)

Habitat Lap Sit

17

Objective

To help students identify the components of a habitat; to recognize how all living things depend upon their habitat; and to understand the implications of loss or change of habitat.

Activity

Divide the students into four groups, with an equal number of students in each group. Name the groups as 'food', 'water', 'shelter' and 'space'. Call out the four names in order. One student from each group should come out and stand one behind the other, to start forming a line. Each student should place his/her hands on the shoulders of the person in the front. Continue to call out the four names in sequence until all students have joined the line. Ask the line of students to now form themselves into a circle without removing their hands from the shoulders of the person in front of them. Make the circle closer by asking them to take one step toward the centre of the circle. Explain that they will slowly count to three. At the count of 'three', you want them all to sit down—each on the knees of the person behind them, keeping their own knees together to support the person in front of them. (Don't worry, this will work). Explain that an intact 'lap-sit' circle like this represents a good habitat. In other words, an environment in which all the components i.e. food, water, shelter and space are in their proper arrangement.

The students at this point may either fall or sit down. Once the disturbance has settled, talk to them about the necessary components of suitable habitat for people and wildlife. Make the students stand and reform the circle. Let the students try the 'lap-sit' circle again! This time ask them to hold their 'lap sit' posture. Explain that this circle represents food, water, shelter and space in their appropriate arrangement. Now, tell students that they will find out what happens when one or more components is removed from the habitat. For example, suppose one year there is a drought and there is no water. Ask any one or two students who are 'water' to come out of the circle. The remaining students must not move closer to each other. Try to make the circle again. Sudents will see the habitat collapse or experience a disturbance in the habitat circle. You could try this with different components—for example, when 'space' is affected due to the spread of human settlements, then the 'space' students come out. Again the circle is affected.

(Continued on page 81)

Materials
None

Age group
10–12 years

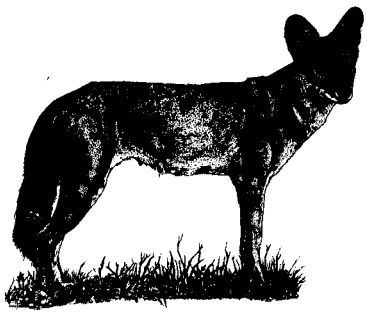
Group size
10–50 players

Subject
Science, Physical Education

Time
30 minutes

Place
Outdoors or Indoors

When
During or after the zoo visit



Dhole or Wild Dog

(Continued from page 78)

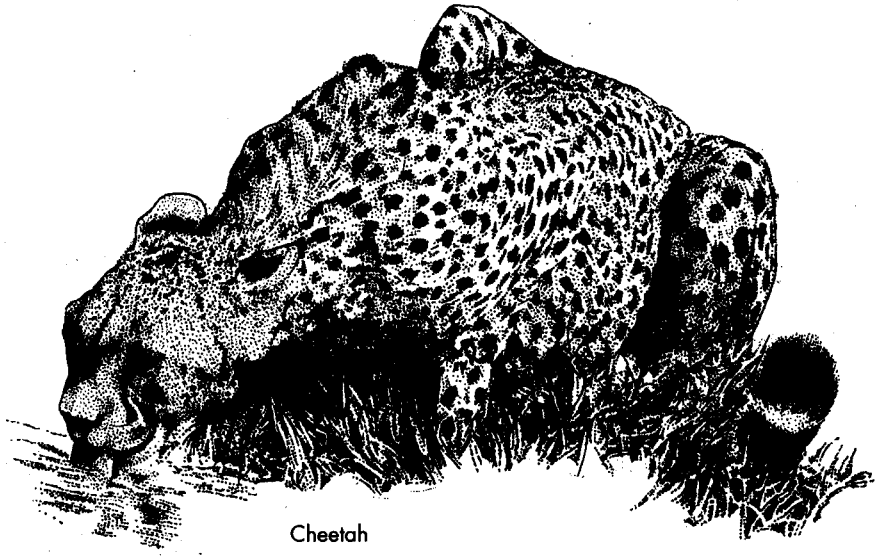
which when it exceeds the limit of tolerance of that animal or population of animals, becomes a limiting factors. It then directly affects the well being of that animal.

The major purpose of the activity is for students to understand that a good habitat is the key to wildlife survival. A population will continue to increase in size until some limiting factors are imposed. The limiting factors contribute to fluctuations in wildlife populations; and nature is never in "balance", but is constantly changing.

Many species found in zoos are threatened with extinction in the wild due to the pressures from ever-increasing human populations, habitat destruction, hunting and poaching and other threats. Such species could perhaps not survive without active intervention from zoos.

Sometimes in the case of some species which are seriously endangered, zoos try to propagate these through captive breeding. In the zoo, all efforts are made to create suitable conditions for these threatened animals to thrive and reproduce, in order to preserve the continued existence of the species.

The conservation status of an animal is often given on the sign board outside the animal enclosure.



Cheetah

(Continued from page 79)

Explain that all the components are inter-related and if any one is affected, others also will be affected. For example, if there is less water, there will be less vegetatton and therefore less food. So, when the water component collapses, the food component will also become unstable. In this way, the entire habitat gets disturbed.

Reform the circle several times, and each time use examples of different components being affected. Students will see that each time, the habitat gets disturbed. Discuss what impact this disturbance could have on the different living things that share the habitat.

Extension/Variation

Have the students form a circle. Walk along the circle, first naming one student as an animal of a particular ecosystem. Name the next four students in the circle as food, water, shelter and space for that animal. Repeat the process until all the students are involved. Briefly discuss the idea of interrelationships. Then move the students into position to the "lap sit" described in the procedure above.

Evaluation

What are the four essential components of habitat?

Explain how the arrangement of food, water, shelter and space is important to humans and other animals.

Based on Habitat Lap Sit, *project Wild.*

18 Wild Facts

Names for Web of Life

Sun	Grass
Air	Dead leaf
Water	Earthworm
Soil	Root
Tree	Shrub
Fruit	Seed
Parrot	Fungus
Algae	Dragonfly
Fish	Monkey
Eagle	Spider
Turtle	Snake
Insect	Mongoose
Frog	Kingfisher
Mosquito	Buffalo
Lizard	Deadwood
Leaf	Honeybee
Flower	Squirrel
Nut	Moss
Butterfly	Grasshopper
Ant	Crocodile

Bumblebee

One of the environmental principles states that "Everything is connected to everything else" and it is this principle which forms the essence of Ecology–the study of interconnections and interdependence of plants, animals and their environment.

Such connections in nature exist at various levels. For example, various living and non-living components in nature are connected through energy flow and nutrient cycling.

Living organisms (belonging to various trophic levels) are connected through food chains, which are in turn connected with each other through food webs.

Different types of ecosystems are linked through transitional zones (called ecotones).

Thus connections, interdependence and interrelatedness are found at all levels in nature. It is for this reason that developing an understanding of these intricate links and connections is crucial for studying and understanding the environment and environmental processes.

However sometimes it is difficult to explain these concepts to students. This could be for two main reasons, firstly these links and connections are usually complex and abstract in nature and therefore translating them into simple concepts and language or demonstrating them is difficult. Secondly, these days students do not get very many opportunities to experience these natural processes in totality. For instance, even while visiting a zoo, a person might get only an impression that the tiger eats meat, may not realize that there are many links in the chain from tiger to its meat, including grass, water, soil, etc. and that disturbing the grasslands, the water bodies, or even the earthworm population could affect the very survival of tiger.

This game can help students to visualize that the animals or birds they saw at the zoo are part of different food chains, and that all food chains start with plants. They can better understand what would happen if any one link in the food chain becomes weak or is missing.

Web of Life

18

Objective

To demonstrate the variety of interrelationships that exist in nature and to help students understand why these relationships are important.

Activity

Ask the students to sit in a circle. Distribute the cards so that each student gets one. Ask each one to pin the label so that it is clearly visible to the others. Make sure that the cards depicting the four main elements, namely, Sun, Soil, Air and Water, are included. Take the ball of string and give it to the Sun. It is appropriate to begin with the Sun because it makes all life possible. Let the Sun wrap one end of the string on the forefinger of the right hand and throw the ball to any aspect of nature related to it, and state the reason why it feels related to the chosen element. For example, if the ball has been passed to Tree or Plant, the student may explain that the Sun gives energy to plants. The Tree receives the ball and then pulls the string taut and winds it around his/her forefinger. Then he/she should pass the ball to whomsoever he/she feels related to e.g. Fruit, and also explain why. Fruit can throw the string to Parrot and so on.

The interlinking of relationships continues as the ball of string, which the students hold together unwinds, and begins to form a pattern.

Ask the students to observe the web-like effect of the string. After all the students become a part of the web, have them raise the web chest high, holding it tightly so that the web does not sag if pressed down. Ask students to note this. Explain that a healthy environment is like the web—strong and resilient.

Then ask the students what would happen if some of these elements were seriously disturbed or disappeared, e.g. water or soil. Ask the students representing these elements to drop the string. Notice the visual effect. Drop more elements to dramatize the effect. Now press the web down. It will touch the ground because it is loose. Explain that this demonstrates a weak and vulnerable system.

Conclude the game by explaining how interrelationship exists in nature and why they are important. Because each component is a part of this complex web of life, the disappearance or weakening of one element will affect some others directly and many others indirectly.

Materials
Blank cards or thick paper for making labels (each carrying the name of an element of nature, see page 82), safety pins or U-pins, ball of string (about 250 m long).

Age group
12–14 years

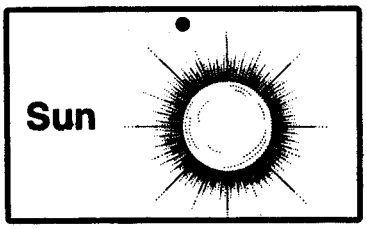
Group size
At least 20

Subject
Science, Arts

Time
35–45 minutes

Place
Outdoors, Indoors

When
Before or after the zoo visit.



19 Wild Facts

Elephants: Need a lot of water, love dust baths, like to use dead trees or tree trunks as rubbing posts. Need salt licks.

Primates: Very active by nature, need 'playthings' like swings, bars, boulders and places to climb. Like to use 'tools' such as sticks. Need secluded box to retire in.

Bears: Love to climb and pick and eat berries off the trees and shrubs. Need trees as rubbing posts. Like the challenge of reaching honey which is suspended on tree or some height. Love termite infested wood.

Small cats: Like some places to climb up and down, and multiple small feedings obtained from different parts of enclosure. Like a few hiding places to be alone at times.

Large cats: Largely inactive during day. Used to hunting for prey in the wild. Need big tree to sharpen claws on, occasionally like to eat grass to keep digestion in order. Need adequate space to move.

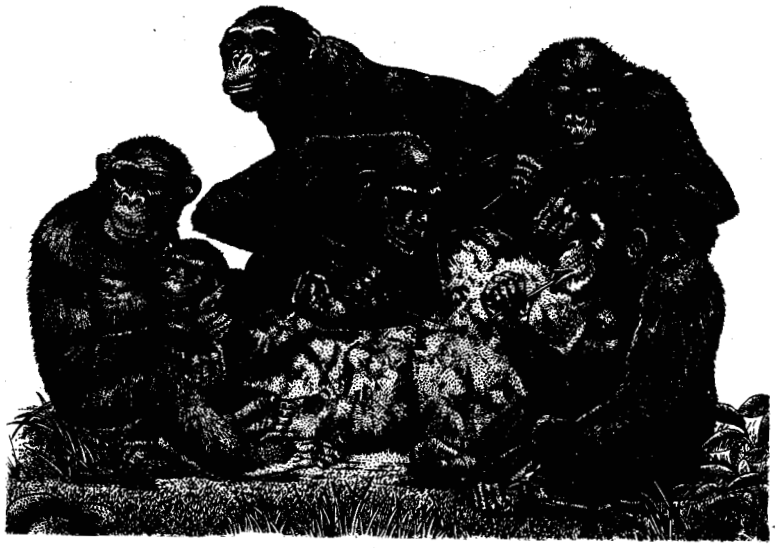
Rhinos: Need lots of trees for rubbing against, love to wallow in water and mud. Like low earth mounds to walk through.

Deer and Antelopes: Need trees to rub off velvet. Some deer like marshy land. Love salt licks.

Hippopotamus: Cannot do without water. Boulders and sand banks around water body are useful. Rubbing post for comfort movements like scratching are necessary.

Animals are adapted to the environments in which they have lived for a long time. If animals are moved to environments different from those to which they are adapted, then special attention must be paid to creating suitable living conditions for them. Zoos have to manage, in captivity, a great variety of animals which are removed from their natural habitat. The challenge is to create suitable enclosures for these animals—enclosures that not only house the animal in safe clean and healthy surroundings but are also conducive to the animal's specific environmental and biological needs.

These enclosures should resemble the natural environment of that animal, keeping in view several basic factors such as temperature, humidity, light, floor cover, etc. In some enclosures there must be enough room to accommodate groups of animals which like living together, e.g. deer and monkeys: Enclosures need also to cater to the behavioural needs of specific animals—for example, tree branches and nesting structures in an aviary or hanging ropes and ladders in monkeys' cages. All these contribute to what is known as enrichment inside zoo enclosures. These are very important as they provide animals with opportunities to perform certain activities as they would in nature. In fact, one of the biggest problems of animals in zoos is boredom.



Chimpanzees

Home Away from Home 19

Objective

To enable students to identify the needs of different animals moved from their natural environment to captivity, and how best to provide for these.

Activity

While going around the zoo ask the students to observe not only the animals, but also the enclosures in which animals are kept. Do they see anything special about some enclosures? If so what, and why was it so? (e.g. some special props such as (branches, ropes etc., temperature/light control). Discuss the enclosures of the animals. Let students observe if there are any special features in the enclosures that relate to the special needs of the particular animals (e.g. water pools for animals that like to be in water, climbing facilities and perches for some, smooth or rough floor surface, etc.) Compare the animals' natural habitats to those provided in the enclosures.

Students should also notice the behaviour of the animals. Were some animals looking bored? Were some engaged in repetitive behaviour such as pacing the floor or walking in circles or biting the bars? (These are also signs of boredom). What could be done to improve the enclosure? Which enclosures recreate the conditions nearest to the natural environment of the animal?

After the zoo visit, give the students a brief description of some animals and their habitat and behaviour (see page 84). Ask the students to imagine that they are designers of zoo enclosures and they have to design an enclosure for each of these animals which is being shifted from its natural habitat to a zoo in their city.

Based on the given information students will sketch/design an enclosure appropriate for the survival of the animal in the climatic conditions of their area. They can list down the things required for the assigned animal in a zoo before beginning to draw. Students may want to work as individuals or in teams. The drawings of enclosure designs can be displayed and discussed in the class.

Evaluation

Describe any five problems an animal would face in captivity. Suggest possible solutions for each problems. Discuss the fact that although animals may live and breed in captivity, their behaviour patterns may not always be the same as they occur in the wild.

Materials
Paper for drawing and crayons

Age group
12–14 years

Group size
Whole class (Individual or group)

Subject
Science, Social Studies

Time
30 minutes

Place
Indoors

When
During and after the zoo visit

Sloth Bear

20 Wild Facts

The Roles

Collector: You are an extremely busy person and the zoo is one small part of your responsibilities. You have gone there briefly once to inaugarate some workshop, but your children go there once every few months. They love to see the birds and monkeys there. You are anxious that this controversy should not reflect badly on your administration.

Zoo Director: You feel harassed and pressured. Your funds have been cut. You have a problem of staff which is very un-cooperative and unionized. You feel very sorry about the death of the lion, who was the pride of your zoo, but feel that you are doing the best you can within a system which is not supportive.

Reporter: You believe that government institutions are ill managed and corrupt. And for you, this story has been the first major story which has brought you into the limelight. You want to make this the first of a series to expose corruption and lack of management in various departments.

Members of 'We love Animals': You are a group that believes that zoos in India are torture houses. You feel that conditions are appalling and that zoos are nothing but a place where animals are teased by humans. You see no reason to capture and keep wild animals in captivity. You feel that though captive breeding, education and research are all cited as reasons to have zoos, none of this really happens. You want to use this case to close all zoos.

Teacher: You are a dedicated Biology teacher who wants to get your students interested in wildlife and conservation issues. In a city, there are few opportunities for children to interact with wildlife. You regularly bring your students to the zoo and feel that these visits help to sensitise them to conservation issues.

Researcher: You are doing your M.Phil in the university. Your thesis topic involves close observation of some animals. You feel that this research would be much more expensive, time-consuming and difficult if it had to be done in the wild. You feel that such research can contribute significantly to conservation efforts. You feel zoos are vital for conservation.

Zoo Biologist: You have successfully captive-bred an endangered animal in this zoo. The habitat of this animal is constantly shrinking and you feel the only way to save such species is through such breeding programmes. You feel that animal rights activists are highly emotional people, without an understanding of the scientific basis of conservation.

NGO: You are an NGO which has done significant work in wildlife conservation. You strongly feel that the conditions in zoos have to be improved urgently, but feel zoos are necessary for various purposes. You have worked with "We love Animals" group in the past, but are not sure what they are aiming at now—for instance where will the animals go if the zoos close? You strongly feel that government institutions must be more transparent in their working and more responsive to public demands.

Corporate Group: You are a big corporate body and this city is your headquarters. You feel that with your funds, management and other capabilities, you can manage the zoo very well. However, you don't want any interference from the government. You feel that running the zoo will increase your visibility with the local public very significantly.

Vendor: You represent the vendors and hawkers of balloons, peanuts, etc. who make a living by selling goods outside the zoo. You are very worried to hear the zoo may be closing down. You feel it is one of the few nice places where a family can come for an outing.

Students: You are students who have often come to the zoo and enjoyed the visit. This is the only place where you can actually see lions and tigers and zebras, and you feel that is great. But you do feel sad because you think the animals do not look too happy or healthy. The cages are cramped and uncomfortable. You would like the zoo to remain but conditions to improve.

Who Needs Zoos?

20

Objective

To make students aware that there are various points of view regarding zoos and to help them clarify their own values regarding these facilities.

Activity

Make 11 groups of 3–4 students each. Ask the students to listen carefully when you read out the following scenario:

"Recently, a lion in the local zoo has died. There have been newspaper reports alleging that this has been due to unsatisfactory conditions in the zoo, including badly designed enclosures, poor quality of food and medical care, and stress due to visitors. On the basis of this report, an animal rights group called "We Love Animals" has gone on a hunger strike outside the zoo, demanding its closure. There is a lot of debate going on in the city about this, as the zoo is a very popular place for picnics, school visits, etc. The Collector, under whose jurisdiction the zoo falls, has called a meeting to discuss the situation and find a resolution. Some NGOs and corporates have offered to take over and run the zoo or help in the management".

Tell the students that they have to imagine that they are attending this meeting with each group playing a certain role. The students are to simulate the entire situation and carry out the "role play".

Distribute each of the role slips to one group (See page 86). Tell the students that they must read the role slip and put themselves into the role of the person/group mentioned there. During the meeting they have to think, feel, act and speak like that person. Give the groups 5 minutes to brainstorm among themselves and come up with points for their role. Each group should select one spokesperson to go to the meeting.

Ask the Collector to convene the meeting. Tell them they have just half-an-hour for the meeting. Let the discussion go on for this time span. Do not intervene unless you feel the discussion is going completely off-track or is becoming unproductive.

After the discussion, debrief the students. Let them talk about their experiences; how they felt; whether they understand the other party's situation, conditions etc. better. Ask them if this is a fair simulation of the real situation. Are there various actors in any decision-making? Are there conflicting views, interests etc.? How can these be resolved?

Materials
Slips of paper, writing materials

Age group
12–15 year

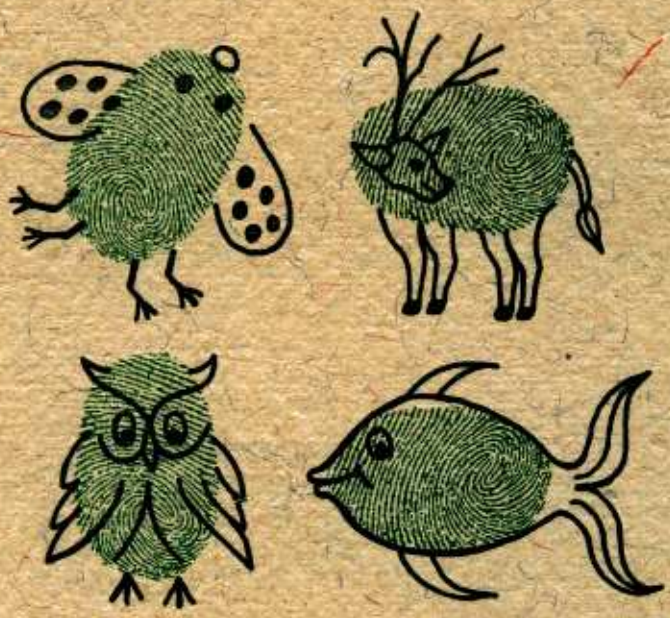
Group size
Whole class

Subject
Social Studies

Place
Indoors, Outdoors

Time
30–45 minute

When
After the zoo visit



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